Panasonic®

Advanced Hybrid System

Installation Manual

Model No. KX-TA824

Thank you for purchasing a Panasonic Advanced Hybrid System.
Please read this manual carefully before using this product and save this manual for future use.

System Components

System Components Table

	Model	Description
Main Unit	KX-TA824	Advanced Hybrid System: 3 to 8 Outside (CO) Lines, 8 to 24 Extensions
Optional Service Cards	KX-TA82461	4-Port Doorphone Card
	KX-TA82470	8-Port Hybrid Extension Card
	KX-TA82481	2-Port Analog CO Line and 8-Port Hybrid Extension Card
	KX-TA82483	3-Port Analog CO Line and 8-Port Hybrid Extension Card
	KX-TA82491	Message Expansion Card for DISA OGMs
	KX-TA82492	2-Channel Voice Message Card
	KX-TA82493	3-Port Caller ID Card
Proprietary Equipment	KX-T30865	Doorphone

Expandability of Outside (CO) Lines and Extensions

	KX-TA82483 Outside (CO) Line: 3 Extension: 8	KX-TA82481 Outside (CO) Line: 2 Extension: 8	KX-TA82470 Outside (CO) Line: 0 Extension: 8	Expanded System
KX-TA824 **Outside (CO) Line: 3** **Extension: 8**	–	–	0	3
	–	–	8	16
	–	2	–	5
	–	8	–	16
	3	–	–	6
	8	–	–	16
	3	–	0	6
	8	–	8	24
	3	2	–	8
	8	8	–	24

Abbreviations in this manual

Proprietary Telephone: PT
Single Line Telephone: SLT
Direct Station Selection: DSS

Compatible Proprietary Telephones

- KX-T7700, KX-T7300, and KX-T7000 series PTs
- KX-T7740, KX-T7340, and KX-T7040 DSS Consoles

- Wireless PTs such as KX-T7885 and KX-TD7895

For the equipment that can be connected to the PBX, refer to "1.2.2 System Connection Diagram".

Important Safety Instructions

When using your telephone equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock and injury to persons, including the following:

1. Read and understand all instructions.

2. Follow all warnings and instructions marked on the product.

3. Unplug the product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Clean with a damp cloth.

4. Do not use this product near water, for example, near a bathtub, wash bowl, kitchen sink, or laundry tub, in a wet basement, or near a swimming pool.

5. Do not place the product on an unstable surface, as a fall may cause serious internal damage.

6. Slots and openings in the front, back and bottom of the cabinet are provided for ventilation; to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface while in use. The product should never be placed near or over a radiator or other heat source. This product should not be placed in a sealed environment unless proper ventilation is provided.

7. The product should only be connected to the type of electrical power supply specified on the product label. If you are not sure of the type of power supply to your home, consult your dealer or local power company.

8. For safety purposes this unit is equipped with a grounded plug. If you do not have a grounded outlet, please have one installed. Do not bypass this safety feature by tampering with the plug.

9. Do not allow anything to rest on the power cord. Do not locate this product where the power cord may be stepped on or tripped on.

10. To reduce the risk of fire or electric shock, do not overload wall outlets and extension cords.

11. Do not insert objects of any kind into this product through its slots and openings, as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electric shock. Never spill liquid of any kind on or in the product.

12. To reduce the risk of electric shock, do not disassemble this product. Only qualified personnel should service this product. Opening or removing covers may expose you to dangerous voltages or other risks. Incorrect reassembly can cause electric shock.

13. Unplug this product from the wall outlet and have it serviced by qualified service personnel in the following cases:

    a) When the power supply cord or plug is damaged or frayed.

    b) If liquid has been spilled into the product.

    c) If the product has been exposed to rain or water.

    d) If the product does not operate according to the operating instructions. Adjust only the controls that are explained in the operating instructions. Improper adjustment of other controls may result in damage and may require service by a qualified technician to restore the product to normal operation.

    e) If the product has been dropped or the cabinet has been damaged.

    f) If product performance deteriorates.

14. Avoid using wired telephones during an electrical storm. There is a remote risk of electric shock from lightning.

15. Do not use a telephone in the vicinity of a gas leak to report the leak.

SAVE THESE INSTRUCTIONS

Precautions

- Keep the unit away from heating appliances and devices that generate electrical noise such as fluorescent lamps, motors and televisions. These noise sources can interfere with the performance of the PBX.
- This unit should be kept free of dust, moisture, high temperature (more than 40 °C [104 °F]) and vibration, and should not be exposed to direct sunlight.
- If you are having problems making calls to outside destinations, follow this procedure to test the outside (CO) lines:

  1. Disconnect the PBX from all outside (CO) lines.

  2. Connect known working single line telephones (SLTs) to those outside (CO) lines.

  3. Make a call to an external destination using those SLTs.

  If a call cannot be carried out correctly, there may be a problem with the outside (CO) line that the SLT is connected to. Contact your telephone company.
  If all SLTs operate properly, there may be a problem with your PBX. Do not reconnect the PBX to the outside (CO) lines until it has been serviced by an authorized Panasonic Factory Servicenter.
- Wipe the unit with a soft cloth. Do not clean the unit with abrasive powders or with chemical agents such as benzene or thinner.

WARNING

- **THIS UNIT MAY ONLY BE INSTALLED AND SERVICED BY QUALIFIED SERVICE PERSONNEL.**
- **IF DAMAGE TO THE UNIT EXPOSES ANY INTERNAL PARTS, DISCONNECT THE POWER SUPPLY CORD IMMEDIATELY AND RETURN THE UNIT TO YOUR DEALER.**
- **UNPLUG THIS UNIT FROM THE AC OUTLET IF IT EMITS SMOKE, AN ABNORMAL SMELL OR MAKES UNUSUAL NOISE. THESE CONDITIONS CAN CAUSE FIRE OR ELECTRIC SHOCK. CONFIRM THAT SMOKE HAS STOPPED AND CONTACT AN AUTHORIZED PANASONIC FACTORY SERVICENTER.**
- **WHEN RELOCATING THE EQUIPMENT, FIRST DISCONNECT THE TELECOM CONNECTION BEFORE DISCONNECTING THE POWER CONNECTION. WHEN THE UNIT IS INSTALLED IN THE NEW LOCATION, RECONNECT THE POWER FIRST, AND THEN RECONNECT THE TELECOM CONNECTION.**
- **TO PREVENT POSSIBLE FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS PRODUCT TO RAIN OR MOISTURE.**
- **THE POWER SUPPLY CORD IS USED AS THE MAIN DISCONNECT DEVICE. ENSURE THAT THE AC OUTLET IS LOCATED NEAR THE EQUIPMENT AND IS EASILY ACCESSIBLE.**

When you ship the product

Carefully pack and send it prepaid, adequately insured and preferably in the original carton.

Attach a postage-paid letter, detailing the symptom, to the outside of the carton. DO NOT send the product to the Executive or Regional Sales offices. They are NOT equipped to make repairs.

Product Service

Panasonic Factory Servicenters for this product are listed in the servicenter directory. Consult your certified Panasonic dealer for detailed instructions.

For Future Reference

Please print, record, and retain the following information for future reference.

Note

The serial number of this product can be found on the label affixed to the unit. You should record the model number and the serial number of this unit as a permanent record of your purchase to aid in identification in the event of theft.

MODEL NO.	_____
SERIAL NO.	_____
DATE OF PURCHASE	_____
NAME OF DEALER	_____
DEALER'S ADDRESS	_____
	_____
	_____
	_____
DEALER'S TEL. NO.	_____

Introduction

About the Installation Manual

This Installation Manual is designed to serve as an overall technical reference for Panasonic Advanced Hybrid System, KX-TA824. It explains how to install the hardware and program this PBX using KX-TA Maintenance Console.

The Installation Manual is divided into the following sections:

Section 1 System Outline

Provides general information on the PBX, including the system capacity and specifications.

Section 2 Installation

Provides detailed instructions for installing the PBX, optional service cards, and peripheral equipment.

Section 3 Guide for KX-TA Maintenance Console

Explains how to install and use KX-TA Maintenance Console, a PC-based programming utility.

Section 4 Troubleshooting

Provides information on troubleshooting and restarting the PBX.

About the Other Manuals

The following manuals are also available:

Feature Manual

The Feature Manual explains what the PBX can do, as well as how to obtain the most of its many features and facilities.

Programming Manual

The Programming Manual explains how to program the PBX using Panasonic proprietary telephones (PTs) or the KX-TA Maintenance Console.

Operating Manual

The Operating Manual describes how users can access commonly used PBX features and functions with their PTs, single line telephones (SLTs), and Direct Station Selection (DSS) Consoles.

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F.C.C. REQUIREMENTS AND RELEVANT INFORMATION

1. **Notification to the Telephone Company**

   This equipment complies with Part 68 of the FCC rules and the requirements adopted by the ACTA. On the side of this equipment is a label that contains, among other information, a product identifier in the format US: ACJMF04BKX-TA824. If requested, this number must be provided to the telephone company.

   Installation must be performed by a qualified professional installer. If required, provide the telephone company with the following technical information:
   - Telephone numbers to which the system will be connected
   - Make: Panasonic
   - Model: KX-TA824
   - Certification No.: found on the side of the unit
   - Ringer Equivalence No.: 0.4B
   - Facility Interface Code: 02LS2
   - Service Order Code: 9.0F
   - Required Network Interface Jack: RJ11

2. **Ringer Equivalence Number (REN)**

   The REN is used to determine the number of devices that may be connected to a telephone line. Excessive RENs on a telephone line may result in the devices not ringing in response to an incoming call. In most, but not all areas, the sum of RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company. The REN for this product is part of the product identifier that has the format US: ACJMF04BKX-TA824. The digits represented by 04 are the REN without a decimal point (e.g., 04 is a REN of 0.4). For earlier products, the REN is separately shown on the label.

3. **Incidence of Harm to the Telephone Lines**

   If this equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

4. **Changes in Telephone Company Communications Facilities, Equipment, Operations and Procedures**

   The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

5. **Trouble with this equipment**

   If trouble is experienced with this equipment, for repair or warranty information, please see the attached warranty, which includes the Servicenter Directory. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

6. **Connection to Party Line**

   Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.

7. **Combined Use with Alarm Equipment**

   If your home has specially wired alarm equipment connected to the telephone line, ensure the installation of this equipment does not disable your alarm equipment. If you have questions about what will disable alarm equipment, consult your telephone company or a qualified installer.

Note

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CAUTION

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this device.

When programming emergency numbers and/or making test calls to emergency numbers:

1. Remain on the line and briefly explain to the dispatcher the reason for the call before hanging up.
2. Perform such activities in the off-peak hours, such as early morning hours or late evenings.

WARNING

The software contained in the TRS feature to allow user access to the network must be upgraded to recognize newly established network area codes and exchange codes as they are placed into service. Failure to upgrade the premises PBXs or peripheral equipment to recognize the new codes as they are established will restrict the customer and the customer's employees from gaining access to the network and to these codes.
KEEP THE SOFTWARE UP-TO-DATE WITH THE LATEST DATA.

Table of Contents

Section 1

System Outline

This section provides general information on the PBX, including system capacity and specifications.

1.1   System Highlights

1.1.1   System Highlights

Built-in Voice Message (BV) (Optional voice message card required)
Built-in Voice Message (BV) allows a caller to leave a voice message in a user's personal message area or the PBX's common message area.

Caller ID Display on SLT
The PBX can receive Caller ID information (telephone numbers and callers' names) from calls received on outside (CO) lines. This information can be shown on the displays of SLTs that support Caller ID as well as proprietary telephones (PTs) when receiving calls.

3-level Automated Attendant (AA)
3-level Automated Attendant (AA) service allows a caller to dial a single-digit number (Direct Inward System Access [DISA] AA number) following the guidance of 3-level DISA outgoing messages (OGMs), and be connected to the desired party automatically.

PC Programming
System programming settings can be accessed using a PC and the Panasonic KX-TA Maintenance Console software as well as by using a PT.
The PBX software can be upgraded via the Serial Interface (RS-232C port) or USB port, using the KX-TA Maintenance Console software.

Quick Setup
Basic PBX parameters such as Automatic Configuration for Outside (CO) Line Type, Country Setting can be programmed the first time the PBX is accessed with a PC using the KX-TA Maintenance Console software.

Call Waiting Caller ID
Call Waiting Caller ID allows the user to see the name or telephone number of a second caller during a conversation.

Local Carrier-based Voice Mail Service
Local carrier-based voice mail service allows the user to receive remote voice mail service from the telephone company to record caller messages when calls cannot be answered.

Wireless Proprietary Telephones (PTs)
Wireless PTs such as the KX-T7885 and the KX-TD7895 give a user the freedom to move around and still have the powerful features of Panasonic PTs. Some examples of the advantages of wireless PTs over wireless SLTs are:

a) Caller ID

b) Seizure of outside (CO) lines by a one-touch operation

c) Carrier-based voice mail service

Refer to the Operating Instructions of the wireless PT for additional information.

Advanced Hybrid System
This PBX supports the connection of PTs, wireless PTs, Direct Station Selection (DSS) Consoles, and single line devices such as SLTs, fax machines, wireless SLTs, and data terminals.

1.2 Basic System Construction

1.2.1 Main Unit

The KX-TA824 has a basic capacity of 3 outside (CO) lines and 8 extensions. It is capable of supporting Panasonic proprietary telephones (PTs), and single line devices such as single line telephones (SLTs), fax machines and data terminals.
One Caller ID card is installed by default to support the Caller ID feature for 3 outside (CO) lines.
To expand its capabilities, the PBX can be equipped with optional components or user-supplied peripherals, such as door openers, external speakers, and an external audio source such as a radio or CD player.

1.2.2   System Connection Diagram
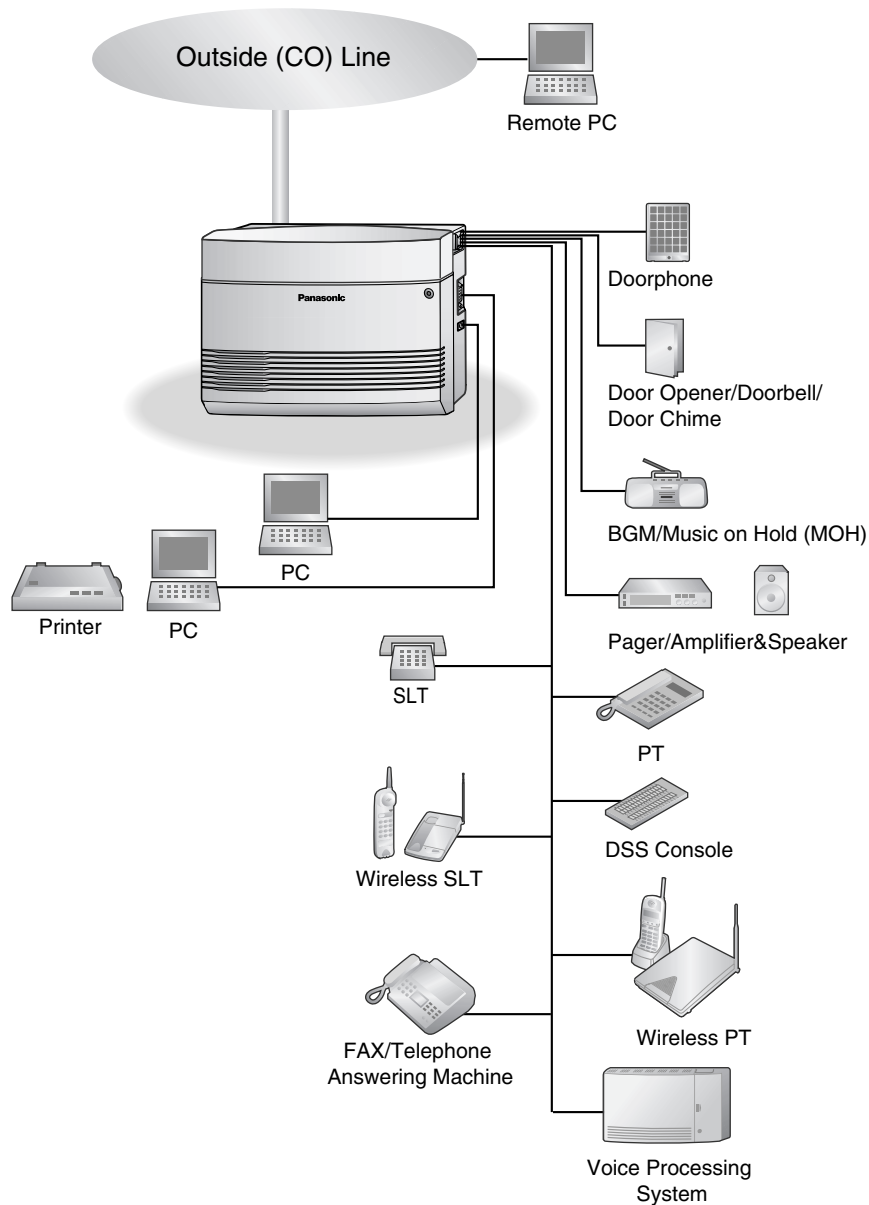
- Connect a display-equipped proprietary telephone (PT) to extension jack 01, as this extension is automatically designated as the manager extension.
- PTs and single line telephones (SLTs) can be connected in parallel. (→2.5.2 Connecting Extensions in Parallel)

1.3   Specifications

1.3.1   General Description

Control Bus		Original bus (16-bit, 24 MHz)	
Switching		Space Division CMOS Crosspoint Switch	
Power Input		100 V AC to 240 V AC, 1.5A to 0.75A, 50 Hz/60 Hz	
Maximum Power Failure Tolerance		300 ms	
Memory Backup Duration		7 years	
Dialing	**Outside (CO) Line**	Pulse (10 pps, 20 pps) or Tone (DTMF)	
	Extension	Pulse (10 pps, 20 pps) or Tone (DTMF)	
Intercom Path		4	
Mode Conversion		Pulse-DTMF	
Ring Frequency		20 Hz/25 Hz (selectable)	
Operating Environment	**Temperature**	0 °C to 40 °C (32 °F to 104 °F)	
	Humidity	10 % to 90 % (non-condensing)	
Conference Call Outside (CO) Line		2	
Music on Hold (MOH)		1 port Selectable MOH: Internal/External/Tone	
Paging	**Internal**	1	
	External	1 port	
Serial Interface Port	**RS-232C**	1	
	USB 1.1	1	
Extension Connection Cable		SLT	1-pair wire (T, R)
		PT	2-pair wire (T, R, H, L)
		DSS Console	1-pair wire (H, L)
Dimensions		368 mm (W) × 284 mm (H) × 102 mm (D) (14-1/2 in × 11-3/16 in × 4 in)	
Weight (when fully expanded)		Approx. 3.5 kg (7.7 lb)	

1.3.2   Characteristics

Terminal Equipment Loop Limit	PT	40 Ω
	SLT	600 Ω including set
	Doorphone	20 Ω
Minimum Leakage Resistance	15 000 Ω minimum	
Maximum Number of Extension Instruments per Line	1 PT or SLT in standard connection 1 PT and 1 SLT in parallel connection	
Ring Voltage	75 Vrms at 20 Hz/25 Hz depending on the ringing load	
Outside (CO) Line Loop Limit	1600 Ω maximum	
Hookswitch Flash/Recall Timing Range	24 ms–2032 ms	
Door Opener Current Limit	30 V DC/125 V AC, 3 A maximum	
Paging Terminal Impedance	600 Ω	
MOH Terminal Impedance	10 000 Ω	

1.3.3 System Capacity

System Capacity

		TA824
Basic System	Outside (CO) lines	3
	Extensions	8
Fully Expanded System	Outside (CO) lines	8
	Extensions	24

Maximum Cards and Terminal Equipment

Item	TA824
PT	24
SLT	24
3-Port Analog CO Line and 8-Port Hybrid Extension Card	1
2-Port Analog CO Line and 8-Port Hybrid Extension Card	1
8-Port Hybrid Extension Card	1
Message Expansion Card for DISA OGMs	1
4-Port Doorphone Card	1
3-Port Caller ID Card	3
2-Channel Voice Message Card	1
Doorphone	4
Door Opener	4
Pager	1
Music on Hold (MOH)	1
DSS Console	2

System Data

Item	Max. Quantity
Operator	1
System Speed Dialing	100
One-touch Dialing	24 per extension (PT)
Personal Speed Dialing	10 per extension
Call Park Area	10
Absent Message	6
Toll Restriction (TRS) COS	5

Item	Max. Quantity
Extension Group	8
Message Waiting	8 per extension
Message for Built-in Voice Message	125 messages (total 60 minutes)

Section 2

Installation

This section describes how to install the PBX. Detailed instructions for installing the main unit and optional service cards, and cabling of peripheral equipment are provided. Information on system expansion and peripheral equipment installation is included.

2.1 Before Installing

2.1.1 Before Installing

Please read the following notes concerning installation and connection before installing the PBX and terminal equipment.
Be sure to comply with all applicable laws, regulations, and guidelines.

Safety Installation Instructions

When installing telephone wiring, basic safety precautions should always be followed to reduce the risk of fire, electric shock and injury to persons, including the following:

1. Never install telephone wiring during a lightning storm.

2. Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.

3. Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.

4. Use caution when installing or modifying telephone lines.

Installation Precautions

This PBX is designed for wall mounting only, and should be installed in a location where it is accessible for inspections and maintenance.
To prevent malfunction, noise, or discoloration, avoid installing the PBX in the following locations:

1. In direct sunlight and hot, cold, or humid places.
   Temperature range: 0 °C to 40 °C (32 °F to 104 °F)

2. Areas where sulfuric gases may be present, such as near thermal springs.

3. Areas where shocks or vibrations are frequent or strong.

4. High-dust areas, or places the PBX may come into contact with water or oil.

5. Near devices that generate high frequencies, such as sewing machines or electric welders.

6. On or near computers, telexes, or other office equipment, as well as microwave ovens or air conditioners. (It is preferable not to install the PBX in the same room as the above equipment.)

7. Within 1.8 m (6 ft) of radios and televisions. (Both the PBX and Panasonic proprietary telephones should be at least 1.8 m (6 ft) away from such devices.)

8. Locations where other objects will obstruct the area around the PBX. Be especially careful to leave at least 20 cm (8 in) of space above and 10 cm (4 in) to the sides of the PBX for ventilation.

Wiring Precautions

Be sure to follow these instructions when wiring the unit:

1. Do not run unshielded telephone cables near AC power cables, computer cables, AC power sources, etc. When running cables near other noise-generating devices or cables, use shielded telephone cables or shield the telephone cables with metal tubing.

2. If cables are run on the floor, use protectors to prevent the cables from being stepped on. Avoid running cables under carpets.

3. Avoid using the same AC outlet for computers, telexes, and other office equipment, as noise generated by such equipment may hamper system performance or interrupt the system.

4. Use 2-pair telephone cables when connecting Panasonic proprietary telephones (PTs).
   Use 1-pair telephone cables when connecting single line telephones (SLTs), data terminals, answering machines, computers, voice processing systems, etc.

5. Unplug the PBX from its power source when wiring, and plug the PBX back in only after all wiring is completed.

6. Mis-wiring may cause the PBX to operate improperly. Refer to Section 2, "Installation" when wiring the PBX.

7. If an extension does not operate properly, disconnect the telephone from the extension line and connect it again, or turn off the PBX using the power switch then turn it on again.

8. For safety purposes this unit is equipped with a grounded plug. If you do not have a grounded outlet, please have one installed. Do not bypass this safety feature by tampering with the plug.

9. Use twisted pair cable for outside (CO) line connection.

10. Outside (CO) lines should be installed with surge protectors. For details, refer to "2.4.1 Connecting Outside (CO) Lines", "2.2.7 Installing Surge Protector".

11. To assure good quality telephone connection, it is recommended new and modifications to existing installation of customer premise wiring shall use solid twisted pair copper conductors with minimum 24 gauge that comply with the electrical specifications for Category 3 wiring as detailed in ANSI/EIA/TIA-570A Building Wiring Standards.

WARNING

Static-sensitive devices are used in this PBX. To protect printed circuit boards from static electricity, do not touch the connectors indicated below. To discharge static electricity from your body, touch ground or wear a grounding strap.

Side View

Warning:Static-sensitive connectors
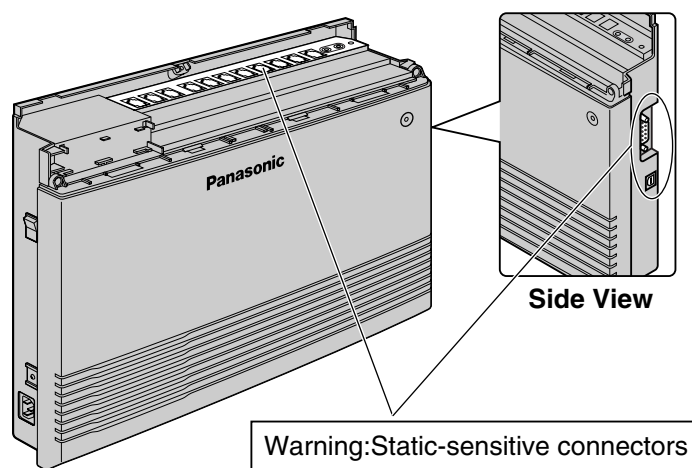
2.2 Installing the Advanced Hybrid System

2.2.1 Unpacking

The following items are included upon shipment.

Main Unit	1
AC Cord	1
CD-ROM, Manuals	1 set
Screw (Wall Mounting)	3
Washer (Wall Mounting)	3
Pager Connector	1
Audio Source Connector	1
Strap	1
Rivet	1

2.2.2   Names and Locations

MOH Jack

Pager Jack

Extension Modular Jacks

Strap Hole

Outside (CO) Line Modular Jacks

Panasonic

RS-232C Port

USB Port

Side View

Power Switch

Protective Ground Terminal

AC Inlet

Run Indicator
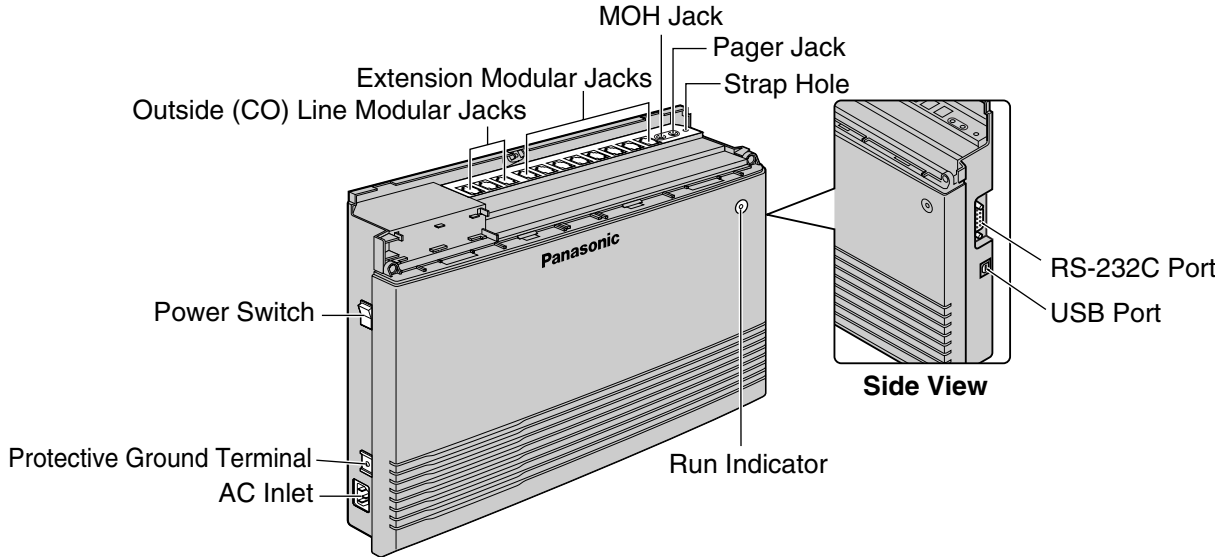
2.2.3   Opening/Closing Covers

Opening Covers

1. Loosen the top cover screw.
2. Remove the top front cover.
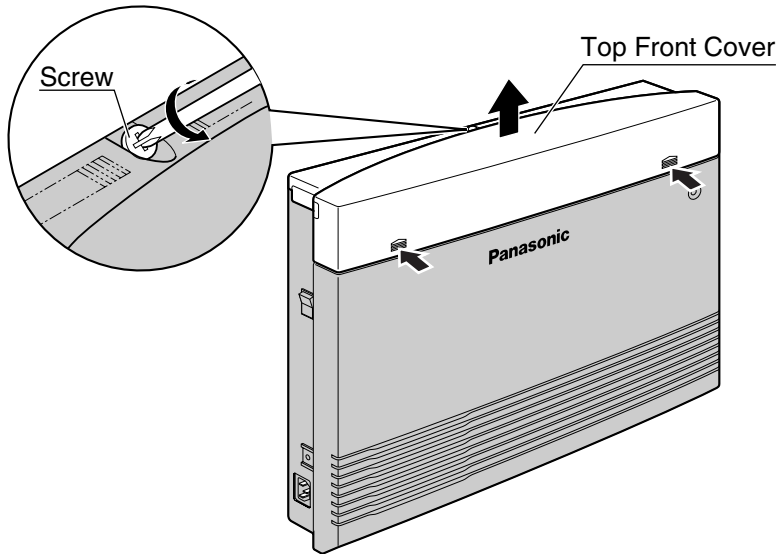
Note

The screw cannot be removed from the cover.

3. Remove the 2 bottom-cover screws.
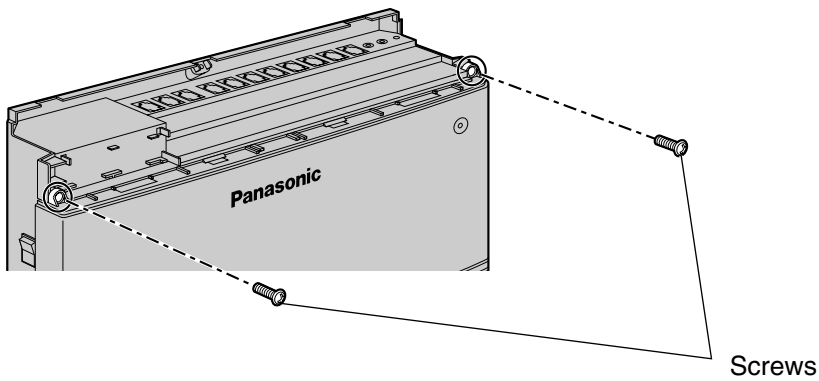
4. Open the bottom front cover.
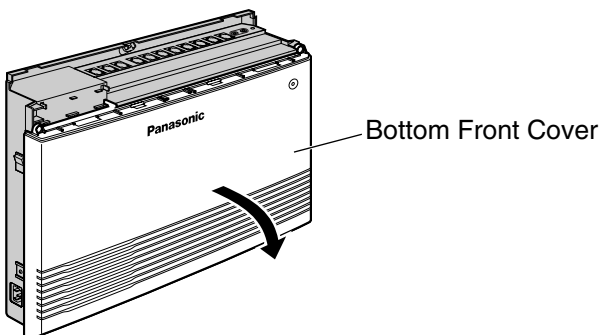
Closing Covers

1. Replace the bottom front cover.
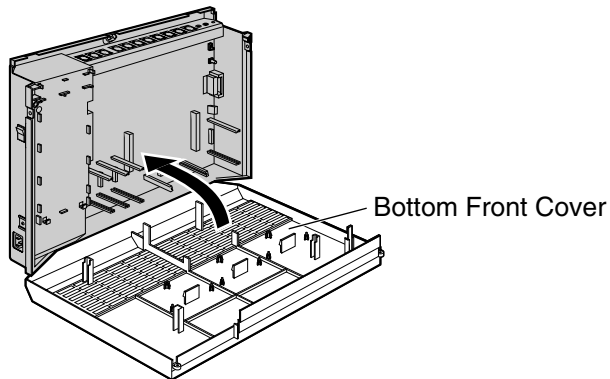
Bottom Front Cover

2. Attach the 2 bottom-cover screws.
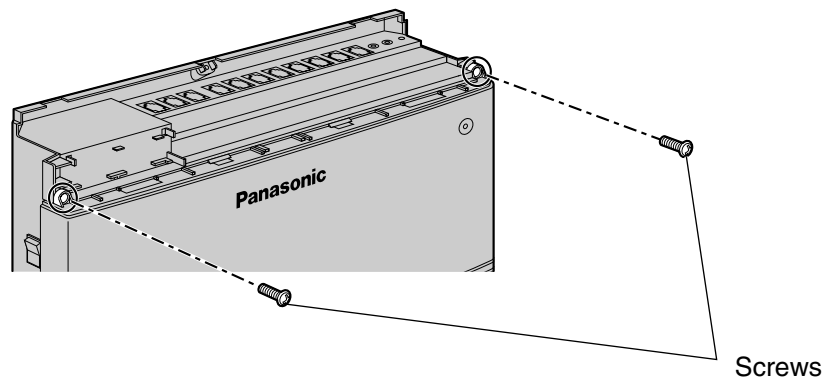
Screws

3. Replace the top front cover and tighten the screw.

Top Front Cover

Screw
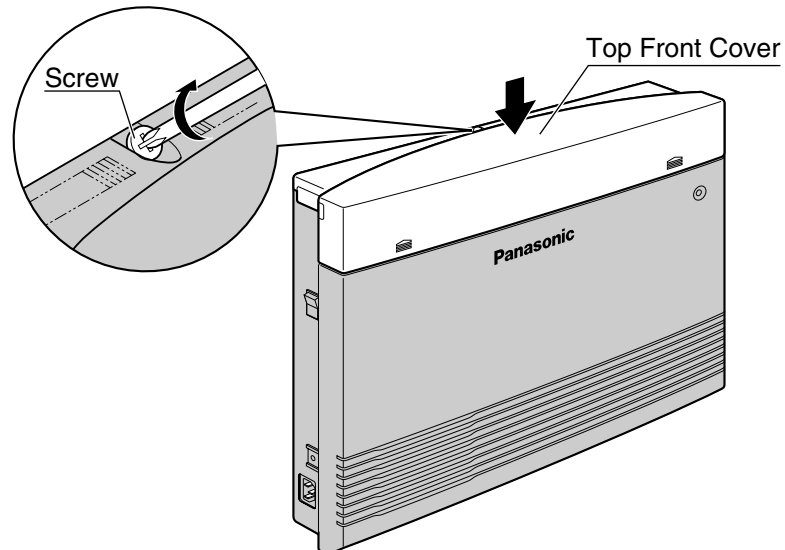
Note

For safety reasons, keep the front covers closed while the PBX is in operation.

2.2.4   Securing Cords

1. Insert the rivet into the hole in the strap.
2. Insert the rivet and strap into the hole on the PBX.
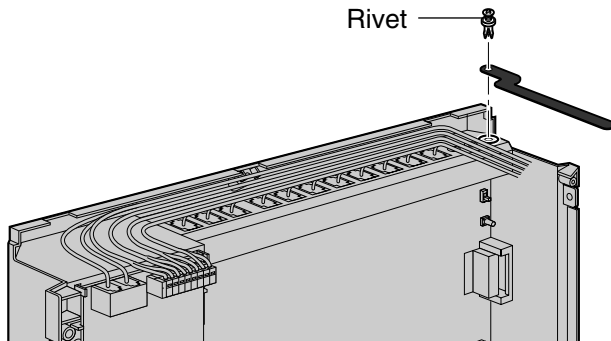
Rivet

3. Wrap the strap around all of the cords.
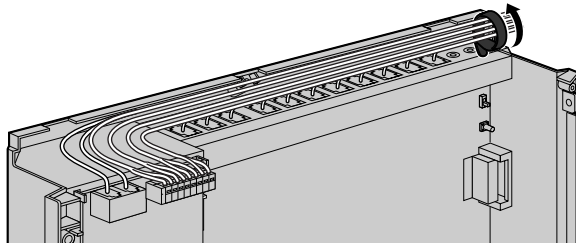
4. Close the covers. (→2.2.3 Opening/Closing Covers)
5. Tie together all of the connected cords and secure them to the wall so that they cannot be pulled out of the PBX.

Panasonic
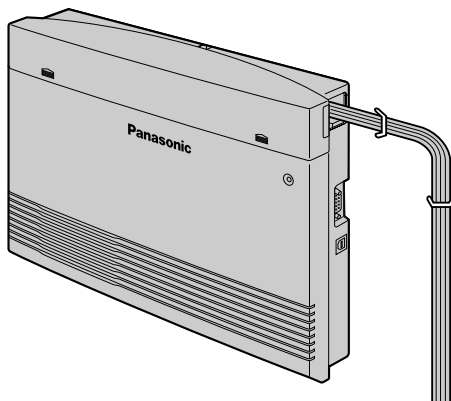
Note

To remove the rivet, use a screwdriver as shown below.
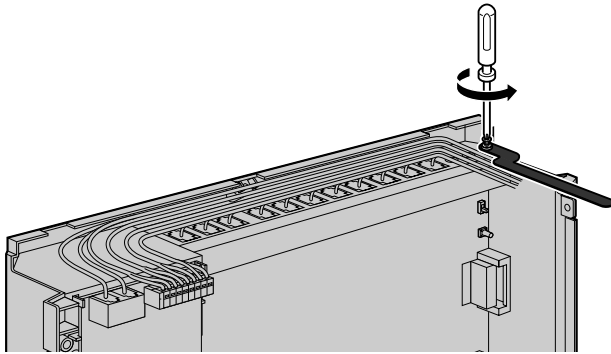
2.2.5   Connecting Frame Ground

IMPORTANT

Connect the frame of the PBX to ground.

1. Loosen the screw.
2. Insert a grounding wire (user-supplied)*.
3. Tighten the screw.
4. Connect the grounding wire to ground.

Grounding Wire

To Ground

Screw
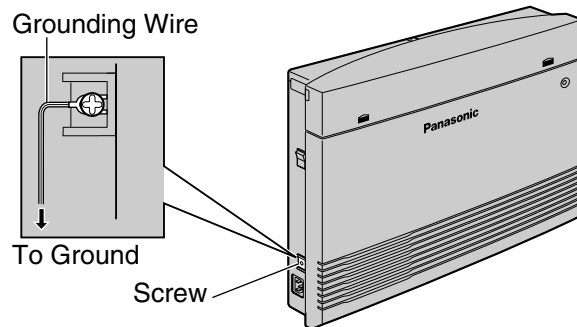
*   Use a grounding wire that has a conductor with a cross-sectional area of at least 0.75 mm^2 or 18 AWG. Green-and-yellow insulation is required.

*   Be sure to comply with all applicable laws, regulations, and guidelines.
*   Proper grounding is very important to protect the PBX from external noise and to reduce the risk of electrocution in the event of a lightning strike.
*   The AC cable's grounding pin may not be enough to protect the PBX from external noise and lightning strikes. A permanent connection must be made between ground and the ground terminal of the main unit.

In most of the continental United States, the ground provided by the "Third wire ground" at the commercial power outlet will be satisfactory. However, in a small percentage of cases this ground may be installed incorrectly. Therefore, the following test procedure should be performed.

Test Procedure

1. Obtain a suitable voltmeter and set it for a possible reading of up to 250 V AC.
2. Connect the meter probes between the 2 main AC voltage points on the wall outlet. The reading obtained should be 108 V AC to 132 V AC.
3. Move one of the meter probes to the 3rd prong terminal (GND).
    Either the same reading or a reading of 0 volt should be obtained.
4. If a reading of 0 volt at one terminal and a reading of 108 V AC to 132 V AC at the other terminal is not obtained, the outlet is not properly grounded.
    This condition should be corrected by a qualified electrician (per article 250 of the National Electrical Code).
5. If a reading of 0 volt at one terminal and a reading of 108 V AC to 132 V AC at the other terminal is obtained, then set the meter to the "OHMS/RX1" scale, place one probe at the GND Terminal and the other probe at the terminal which gave a reading of 0 volt.
    A reading of less than 1 ohm should be obtained. If the reading is not obtained, the outlet is not adequately grounded. See qualified electrician.

2.2.6   Wall Mounting

The PBX is designed for wall mounting only. The wall where the PBX is to be mounted must be able to support the weight of the PBX. When wall mounting the main unit, use either the included screws, or screws of the same size.

Mounting on a Wooden Wall

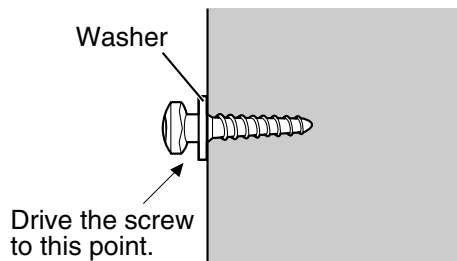The included screws may be used when mounting the main unit on a wooden wall.

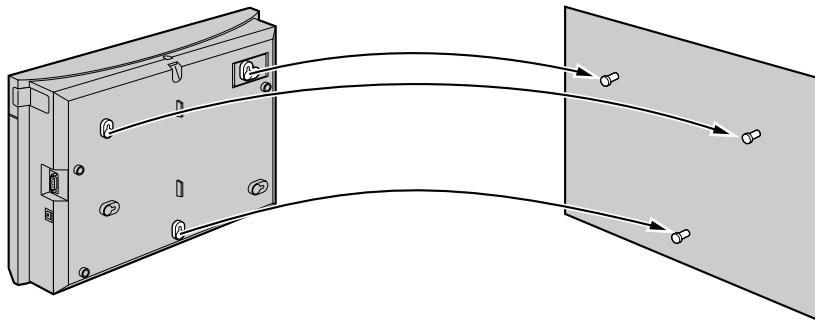**1.** Place the template (found on the last page of this manual) on the wall to mark the 3 screw positions.
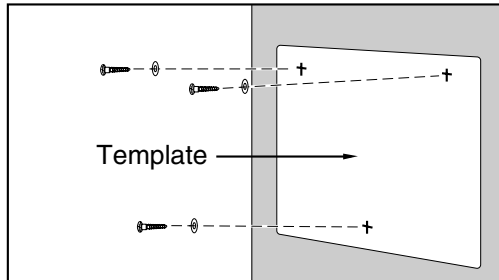
Note

When you print out the template, the distance on the paper output may deviate slightly from the indicated measurement. In this case, use the indicated measurement.

2. Fit the washers on the screws, and drive the screws into the wall.

3. Affix the PBX to the screw heads.

Notes

- Do not block the openings of the cabinet. Leave at least 20 cm (8 in) of space above and 10 cm (4 in) to the sides of the PBX for ventilation.
- Make sure that the wall behind the cabinet is flat and free of obstacles, so that the openings on the back of the cabinet will not be blocked.
- Be careful not to drop the cabinet.

Mounting on a Concrete or Mortar Wall

The included screws may be used when mounting the main unit on a concrete or mortar wall. User-supplied anchor plugs are also necessary.
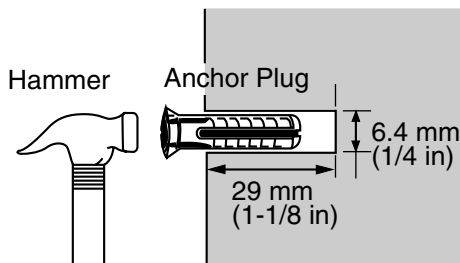
1. Place the template (found on the last page of this manual) on the wall to mark the 3 screw positions.
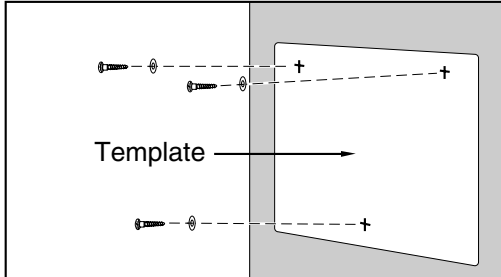
Note

> When you print out the template, the distance on the paper output may deviate slightly from the indicated measurement. In this case, use the indicated measurement.

2. Drill holes in the wall as marked and fit the anchor plugs (not included) into the holes.

3. Fit the washers on the screws, and drive the screws into the anchor plugs.
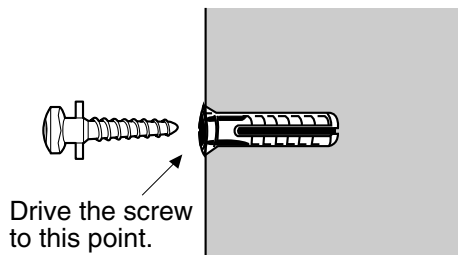
4. Affix the PBX to the screw heads.
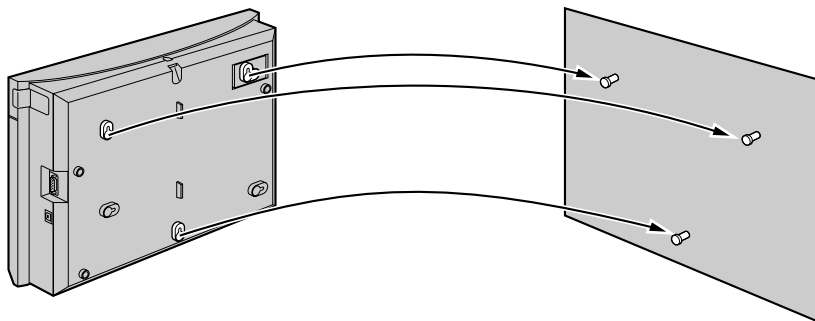
<u>Notes</u>

- Do not block the openings of the cabinet. Leave at least 20 cm (8 in) of space above and 10 cm (4 in) to the sides of the PBX for ventilation.
- Make sure that the wall behind the cabinet is flat and free of obstacles, so that the openings on the back of the cabinet will not be blocked.
- Be careful not to drop the cabinet.

2.2.7   Installing Surge Protector

Overview

A massive electrical surge can be caused if lightning strikes a telephone cable 10 m (33 ft) above ground, or if a telephone line comes into contact with a power line. A surge protector is a device that is connected to an outside (CO) line to prevent potentially dangerous electrical surges from entering the building via the outside (CO) lines and damaging the PBX and connected equipment.

To protect the PBX from electrical surges, we strongly recommend connecting the PBX to a surge protector that meets the following specifications:

–   Surge arrestor type: 3-electrode arrestor

–   DC spark-over voltage: 230 V

–   Maximum peak current: at least 10 kA

Additionally, proper grounding is very important for the protection of the PBX. (→2.2.5 Connecting Frame Ground)

Many countries/areas have regulations requiring surge protection. Be sure to comply with all applicable laws, regulations, and guidelines.

Installation

Outside Installation

(Main Building)

Outside (CO) Line

Surge Protector

Outside (CO) Line

Terminal Board

PBX

Extn.

Extn.

Extn.

SLT   PT

(Another Building)

SLT

PT

Extn.

Surge Protector

Ground

Extn.: Extension Line
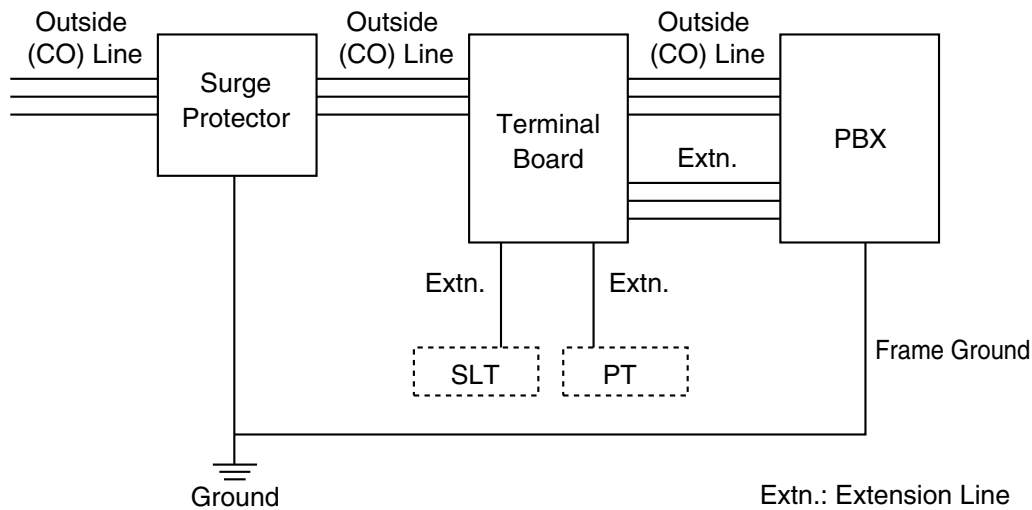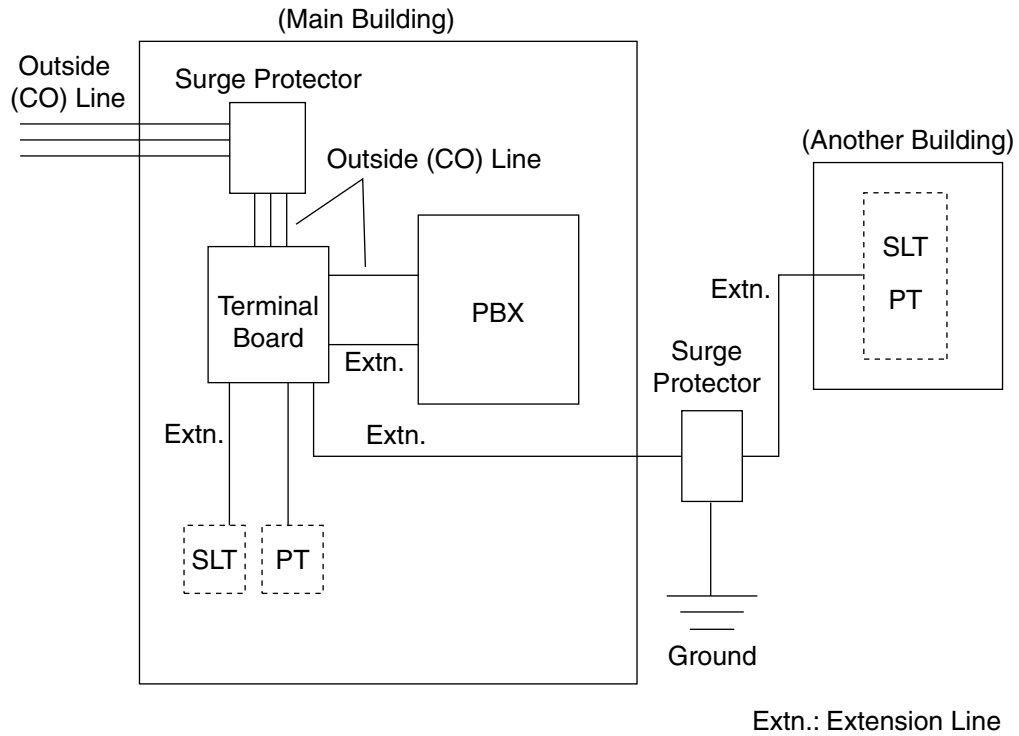
If you install an extension outside of the building, the following precautions are recommended:

    a. Install the extension wire underground.

    b. Use a conduit to protect the wire.

Note

    The surge protector for an extension is different from that for an outside (CO) line.

Installation of a Ground Rod

Surge Protector

Outside (CO) Line

Grounding Wire

PBX

(Underground)
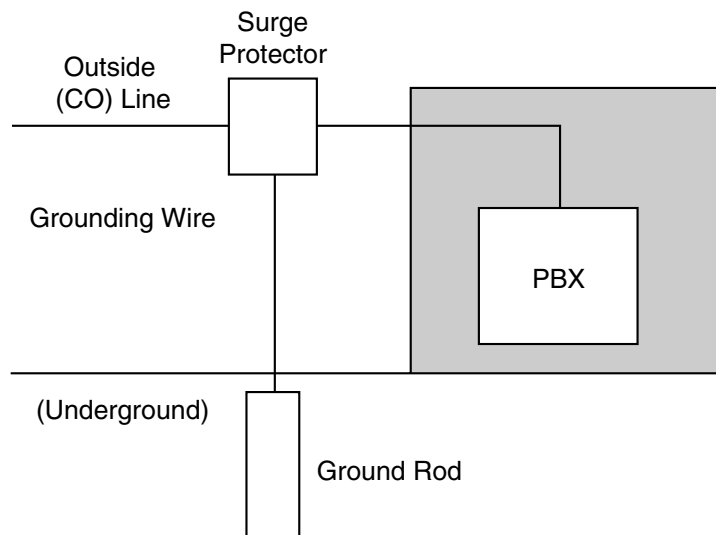
Ground Rod

1. Connect the ground rod to the surge protector using a grounding wire with a cross-sectional area of at least 16 AWG.

2. Bury the ground rod near the protector. The grounding wire should be as short as possible.
3. The grounding wire should run straight to the ground rod. Do not run the wire around other objects.
4. Bury the ground rod at least 50 cm (20 in) underground.

<u>Notes</u>

- The above figures are recommendations only.
- The length of the ground rod and the required depth depend on the composition of the soil.
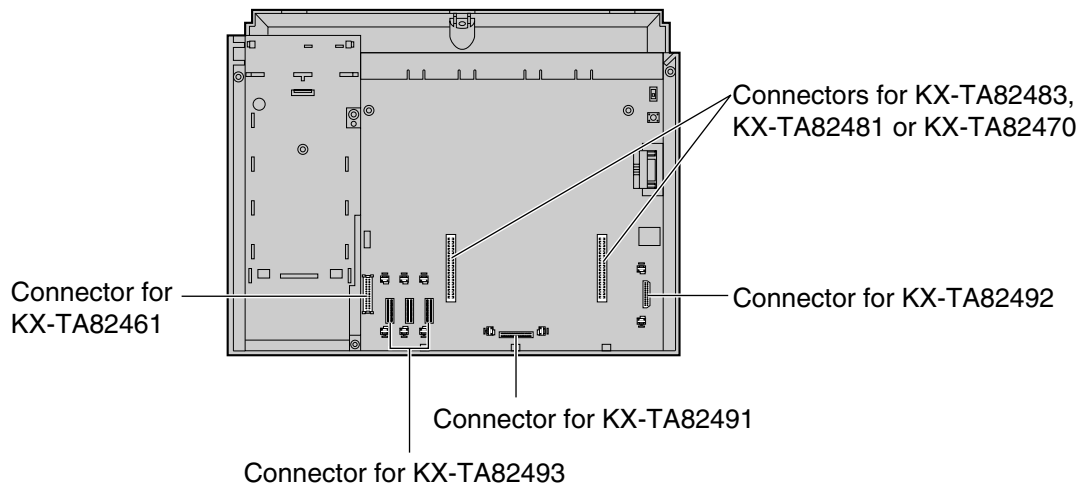
2.3 Installing Optional Service Cards

2.3.1 Location of Optional Service Cards

Optional service cards are installed by opening the front covers of the main unit and affixing the cards to the appropriate connectors. Each card should be installed in the appropriate location as shown below.

See "System Components Table" for the description of each optional service card.

CAUTION

To protect the printed circuit boards (P-boards) from static electricity, do not touch parts on the P-boards in the main unit and on the optional service cards. If you must touch the P-boards, wear a grounding strap.

Note

Before installing optional service cards, turn off the PBX and unplug the AC cord.

2.3.2   3-Port Analog CO Line and 8-Port Hybrid Extension Card (KX-TA82483)

Function

Adds 3 outside (CO) lines and 8 hybrid extensions on the KX-TA824 basic system.

### Installing KX-TA82483 to KX-TA824

1. Loosen the screws and open the top and bottom front covers. (→2.2.3 Opening/Closing Covers)

2. Using cutting pliers, cut the 6 parts marked with circles, and remove the upper front panel as shown below.

Upper Front Panel

Lower Front Panel
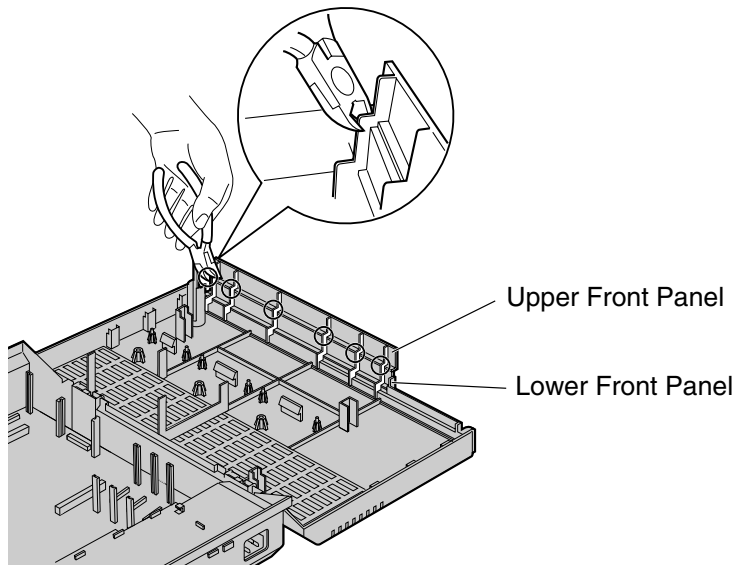
3. Cut off any excess plastic in order to make the surface smooth.
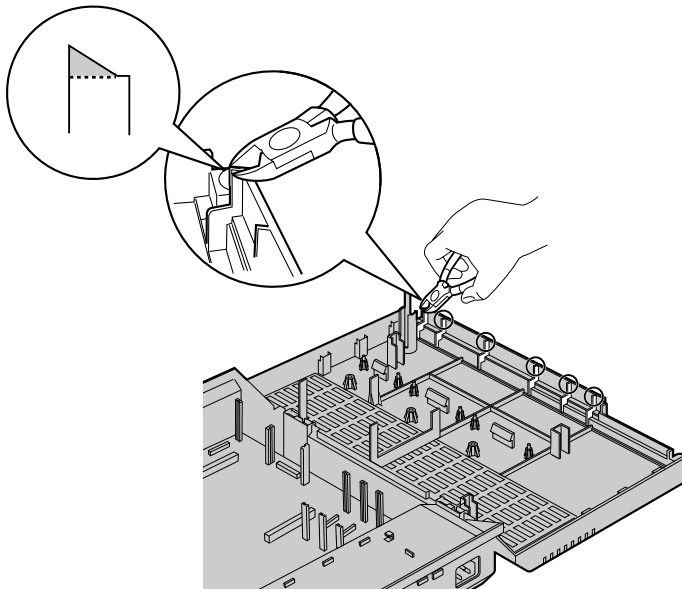
4. Attach the 2 extension connectors to the main unit, install the card as shown below, and secure the 3 extension bolts.
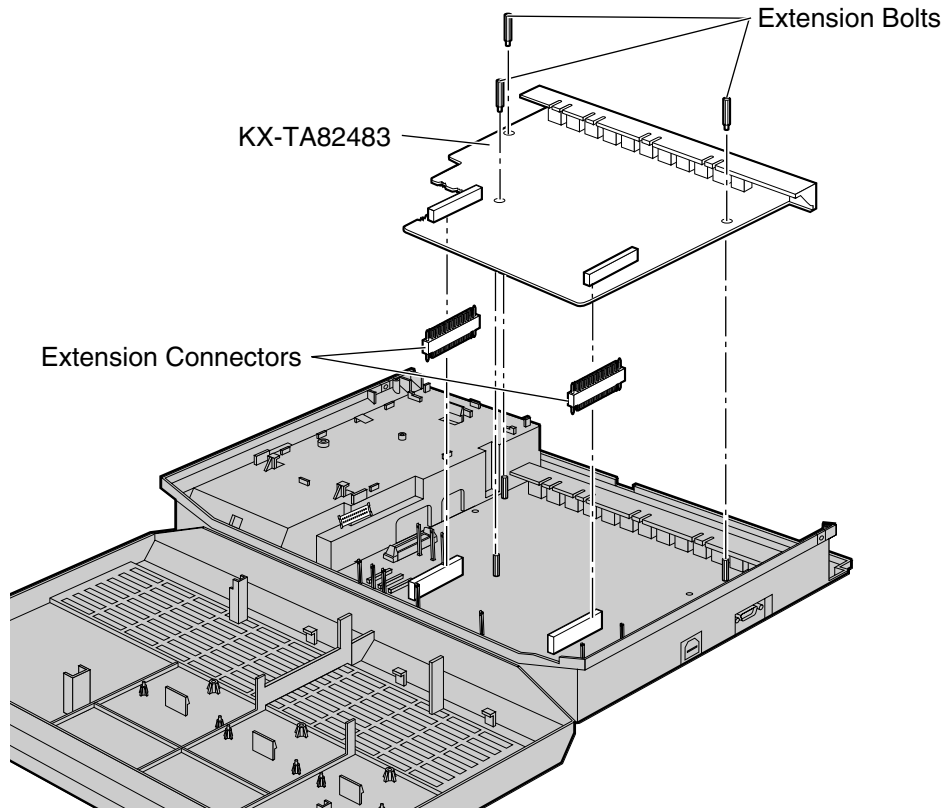
5. Insert the modular plugs of the telephone line cords (2-conductor wiring) into the card's modular CO ports. (→2.4.1 Connecting Outside (CO) Lines)

6. Connect the line cords to the terminal board or the modular jacks from the telephone company.

7. Insert the modular plugs of the telephone line cords (2- or 4-conductor wiring) into the card's modular extension jacks. (→2.5.1 Connecting Extensions)

8. Wrap the strap around all of the cords. (→2.2.4 Securing Cords)

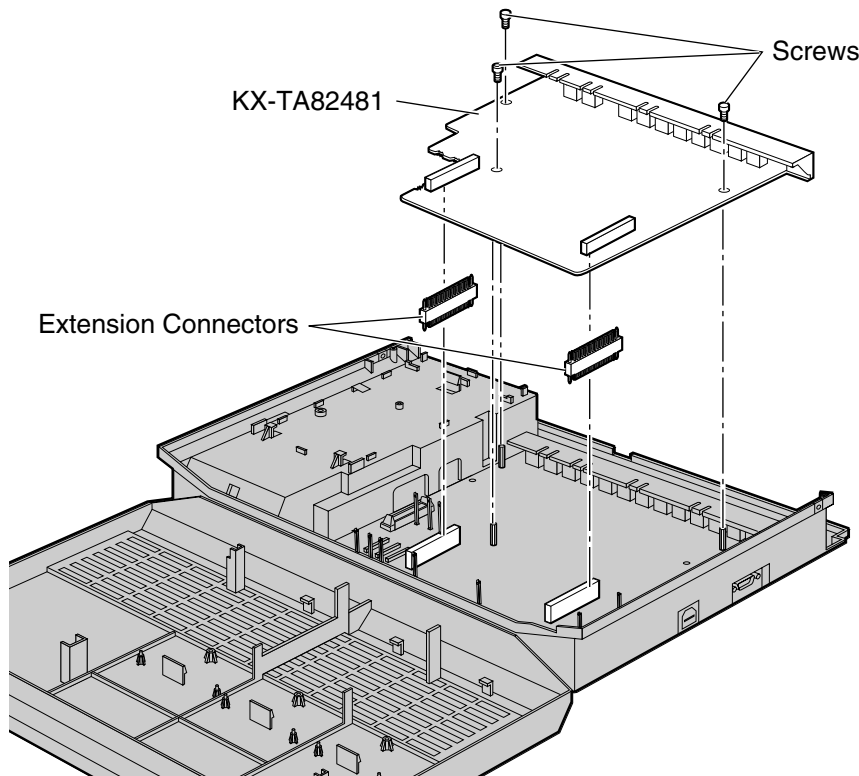**9.** Close the covers and secure the screws. (→2.2.3 Opening/Closing Covers)

2.3.3   2-Port Analog CO Line and 8-Port Hybrid Extension Card (KX-TA82481)

Function

Adds 2 outside (CO) lines and 8 hybrid extensions on the basic system of KX-TA824.

Installing KX-TA82481 to KX-TA824

1. Loosen the screws and open the top and bottom front covers. (→2.2.3 Opening/Closing Covers)
2. Remove the upper front panel. Refer to the previous section for the cutting procedure. (→2.3.2 3-Port Analog CO Line and 8-Port Hybrid Extension Card (KX-TA82483))
3. Attach the 2 extension connectors to the main unit, install the card as shown below, and secure the 3 screws.
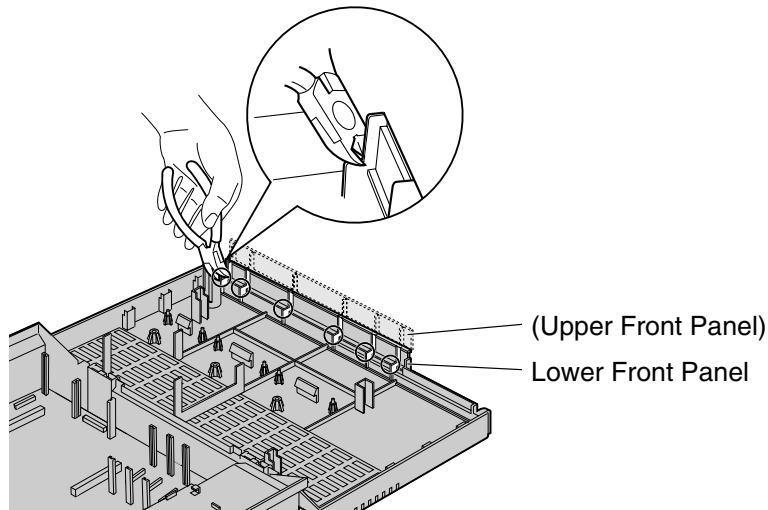

4. Insert the modular plugs of the telephone line cords (2-conductor wiring) into the card's modular CO ports. (→2.4.1 Connecting Outside (CO) Lines)
5. Connect the line cords to the terminal board or the modular jacks from the telephone company.
6. Insert the modular plugs of the telephone line cords (2- or 4-conductor wiring) into the card's modular extension jacks. (→2.5.1 Connecting Extensions)
7. Wrap the strap around all of the cords. (→2.2.4 Securing Cords)
8. Close the covers and secure the screws. (→2.2.3 Opening/Closing Covers)

Installing KX-TA82481 on 3-Port Analog CO Line and 8-Port Hybrid Extension Card (KX-TA82483) installed to KX-TA824

Note

Install the KX-TA82481 on top of the KX-TA82483.

1. Loosen the screws and open the top and bottom front covers. (→2.2.3 Opening/Closing Covers)

2. Using cutting pliers, cut the 6 parts marked with circles, and remove the lower front panel or both upper and lower front panels as shown below.
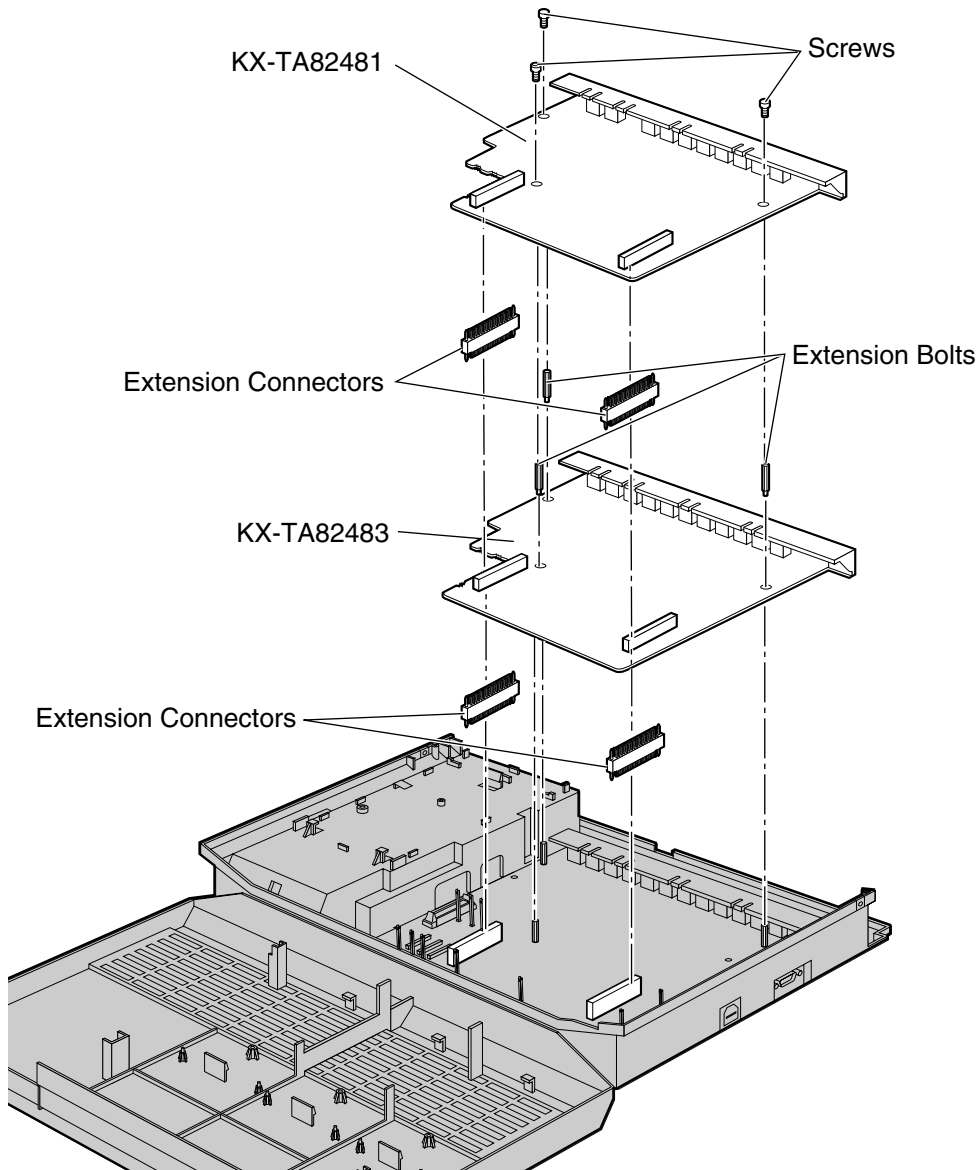

(Upper Front Panel)

Lower Front Panel

3. Cut off any excess plastic in order to make the surface smooth.
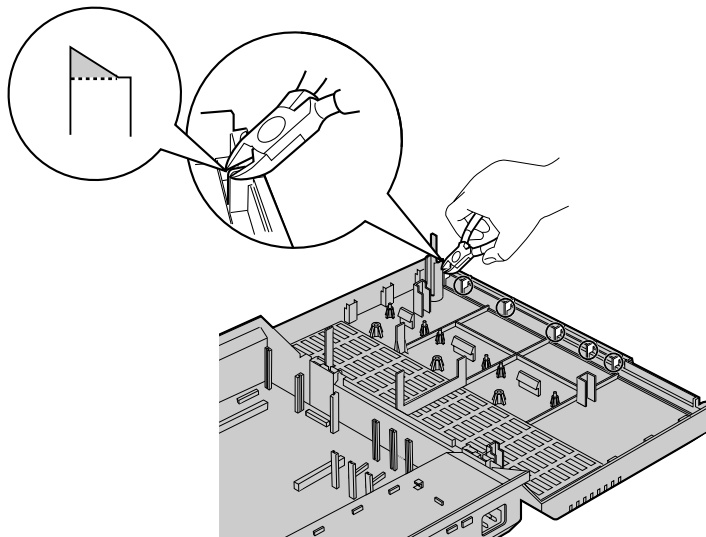
4. Attach the extension connectors and extension bolts, install the cards as shown below, and secure the 3 screws.

KX-TA82481

Screws

Extension Connectors

Extension Bolts

KX-TA82483

Extension Connectors

5. Insert the modular plugs of the telephone line cords (2-conductor wiring) into the card's modular CO ports. (→2.4.1 Connecting Outside (CO) Lines)

6. Connect the line cords to the terminal board or the modular jacks from the telephone company.

7. Insert the modular plugs of the telephone line cords (2- or 4-conductor wiring) into the card's modular extension jacks. (→2.5.1 Connecting Extensions)

8. Wrap the strap around all of the cords. (→2.2.4 Securing Cords)

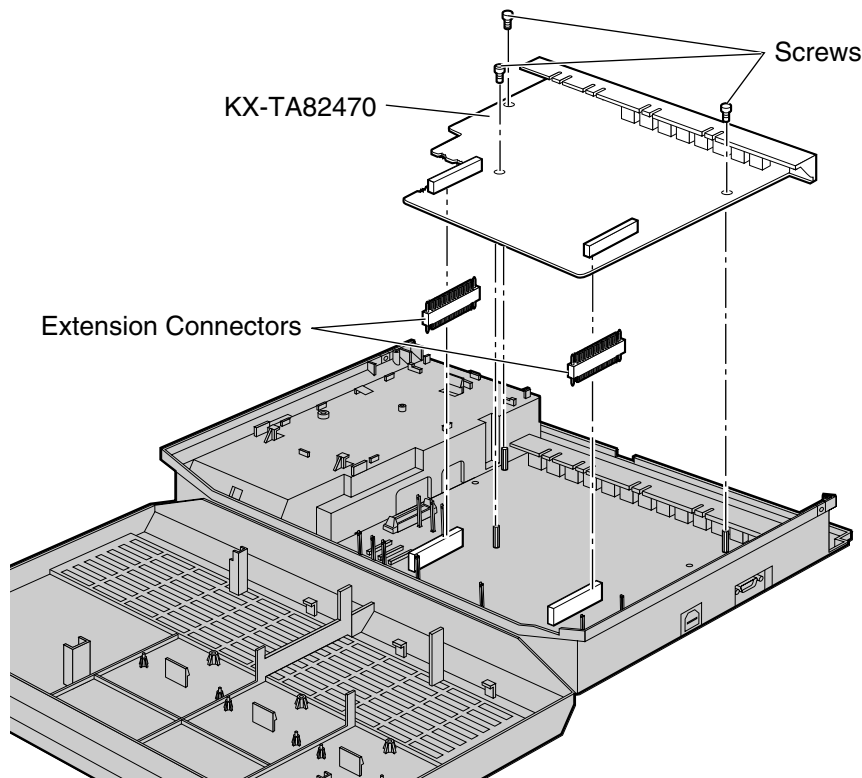**9.** Close the covers and secure the screws. (→2.2.3 Opening/Closing Covers)

2.3.4   8-Port Hybrid Extension Card (KX-TA82470)

Function

Adds 8 hybrid extensions on the basic system of KX-TA824.

Installing KX-TA82470 to KX-TA824

1. Loosen the screws and open the top and bottom front covers. (→2.2.3 Opening/Closing Covers)
2. Remove the upper front panel. Refer to the previous section for the cutting procedure. (→2.3.2 3-Port Analog CO Line and 8-Port Hybrid Extension Card (KX-TA82483))
3. Attach the 2 extension connectors to the main unit, install the card as shown below, and secure the 3 screws.
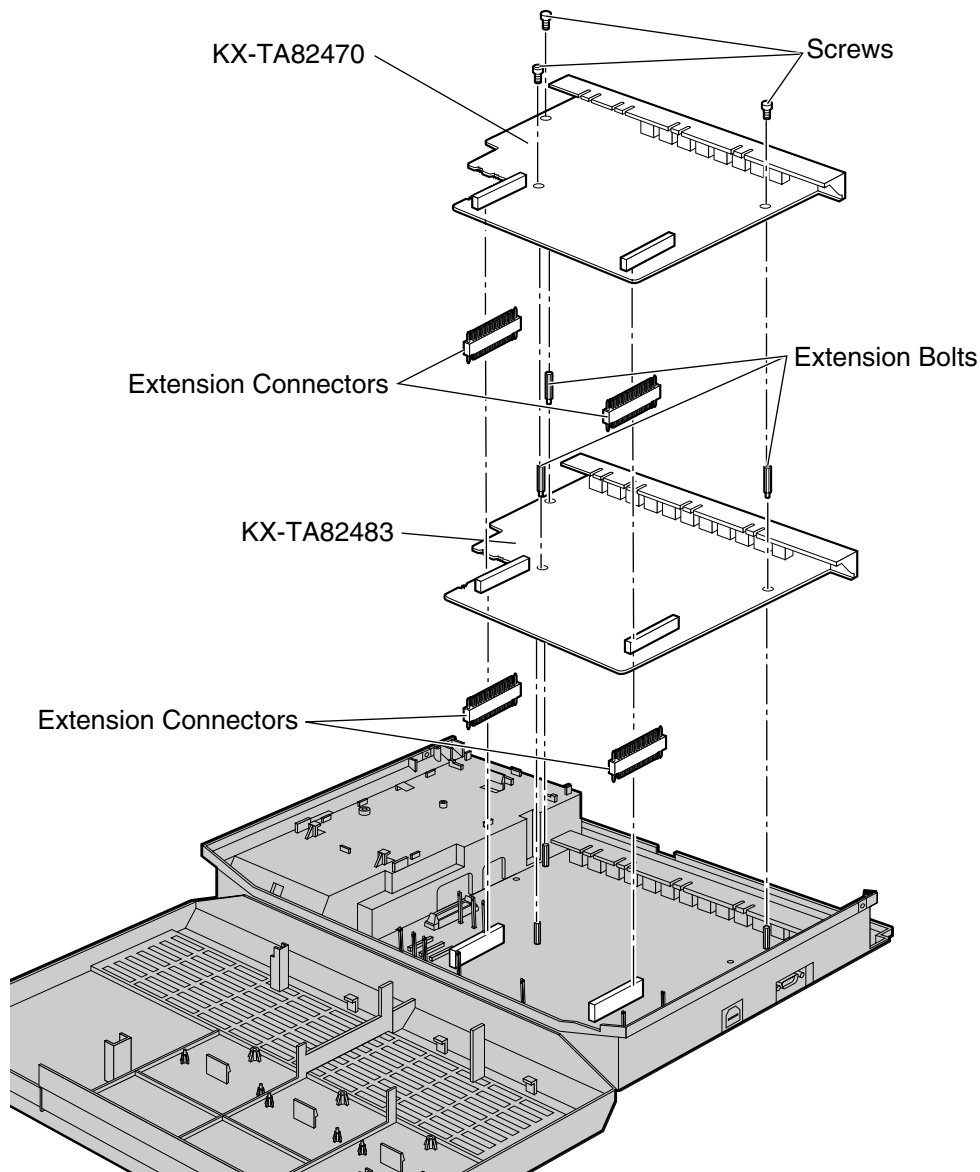

4. Insert the modular plugs of the telephone line cords (2-conductor wiring) into the card's modular CO ports. (→2.4.1 Connecting Outside (CO) Lines)
5. Connect the line cords to the terminal board or the modular jacks from the telephone company.
6. Insert the modular plugs of the telephone line cords (2- or 4-conductor wiring) into the card's modular extension jacks. (→2.5.1 Connecting Extensions)
7. Wrap the strap around all of the cords. (→2.2.4 Securing Cords)
8. Close the covers and secure the screws. (→2.2.3 Opening/Closing Covers)

Installing KX-TA82470 on 3-Port Analog CO Line and 8-Port Hybrid Extension Card (KX-TA82483) installed to KX-TA824

<u>Note</u>

Install the KX-TA82470 on top of the KX-TA82483.

1. Loosen the screws and open the top and bottom front covers. (→2.2.3 Opening/Closing Covers)

2. Remove the lower front panel or both upper and lower front panels. For the cutting procedure, refer to "Installing KX-TA82481 on 3-Port Analog CO Line and 8-Port Hybrid Extension Card (KX-TA82483) installed to KX-TA824". (→2.3.3 2-Port Analog CO Line and 8-Port Hybrid Extension Card (KX-TA82481))

3. Attach the extension connectors, install the cards as shown below, and secure the 3 screws.

4. Insert the modular plugs of the telephone line cords (2- or 4-conductor wiring) into the card's modular extension jacks. (→2.5.1 Connecting Extensions)

5. Wrap the strap around all of the cords. (→2.2.4 Securing Cords)

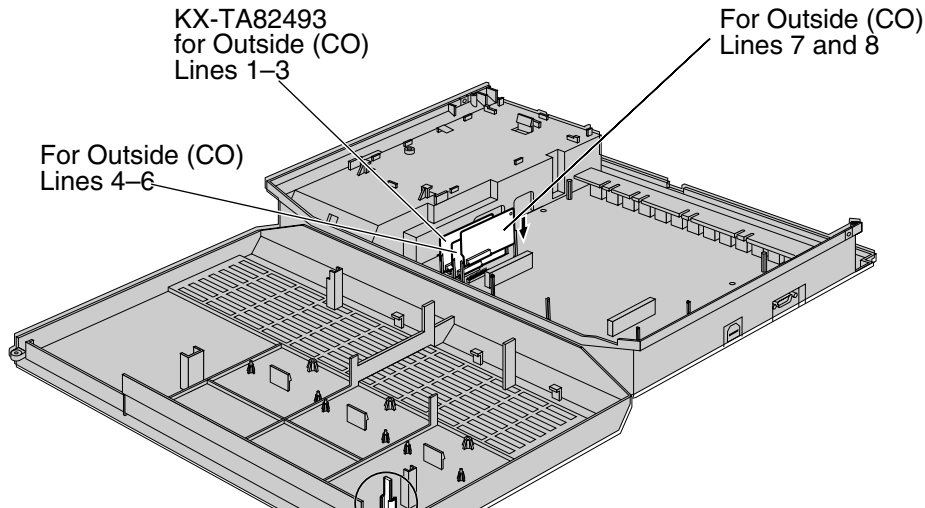6. Close the covers and secure the screws. (→2.2.3 Opening/Closing Covers)

2.3.5   3-Port Caller ID Card (KX-TA82493)

Function

Adds Caller ID support for 3 outside (CO) lines. 1 card is installed by default for outside (CO) lines 1–3. The first optional card can be installed for outside (CO) lines 4–6 and the second optional card can be installed for outside (CO) lines 7 and 8.
FSK and DTMF Caller ID types are supported. For information on the type of Caller ID used in your area, contact your telephone company.

1.   Loosen the screws and open the top and bottom front covers. (→2.2.3 Opening/Closing Covers)

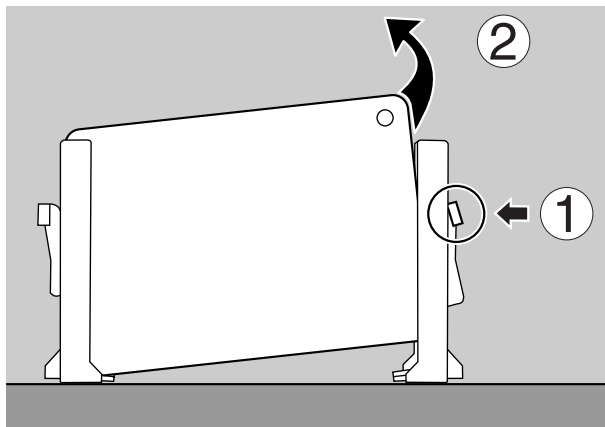2.   Slide the card between the guiderails until it clicks, and attach the connector to it.

KX-TA82493
for Outside (CO)
Lines 1–3

For Outside (CO)
Lines 7 and 8

For Outside (CO)
Lines 4–6

Note

> Use extra care to make sure you do not damage the part of the case marked with a circle.

3.   Close the covers and secure the screws. (→2.2.3 Opening/Closing Covers)

Note

> To uninstall the card, follow the instructions illustrated below.

1.   Push the catch on the side of one guardrail in the direction of the arrow to release it.

2.   Lift the edge of the card while holding the catch open. (Do not touch the circuit board of the card during the operation.)
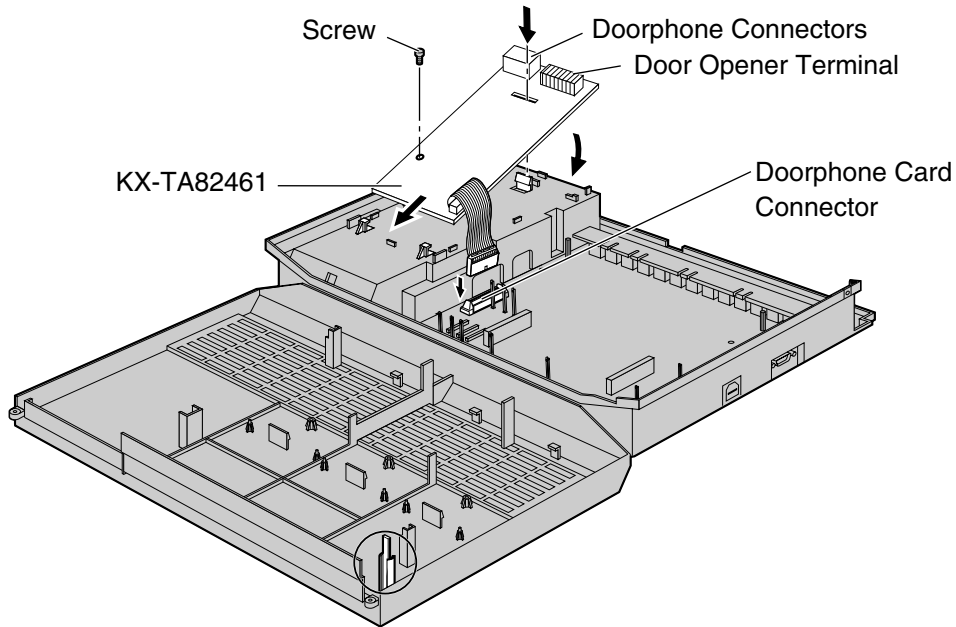
Feature Manual References

      1.1.30 Caller ID

      1.1.78 Local Carrier-based Voice Mail Service

2.3.6 4-Port Doorphone Card (KX-TA82461)

Function

Supports the connection of 4 doorphones and 4 door openers.

1. Loosen the screws and open the top and bottom front covers. (→2.2.3 Opening/Closing Covers)

2. Attach the 4-Port Doorphone Card to the main unit, connect the cord to the Doorphone Card Connector and secure the screw.

Note

Use extra care to make sure you do not damage the part of the case marked with a circle.

3. Close the covers and secure the screws. (→2.2.3 Opening/Closing Covers)

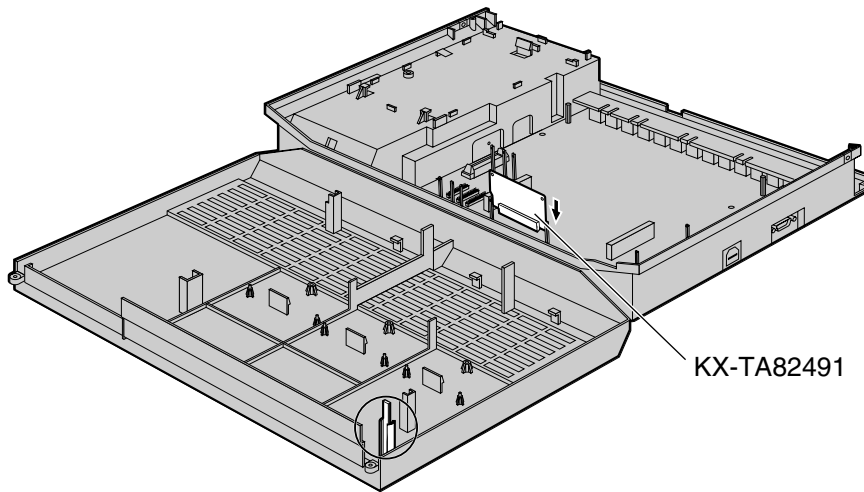**Feature Manual References**

1.1.46 Door Open
1.1.48 Doorphone Call

2.3.7   Message Expansion Card for DISA OGMs (KX-TA82491)

Function

When an optional message expansion card for DISA OGMs is added, up to 2 messages can be played simultaneously for callers and the total recording time of the PBX is increased from 3 to 6 minutes.

1.   Loosen the screws and open the top and bottom front covers. (→2.2.3 Opening/Closing Covers)

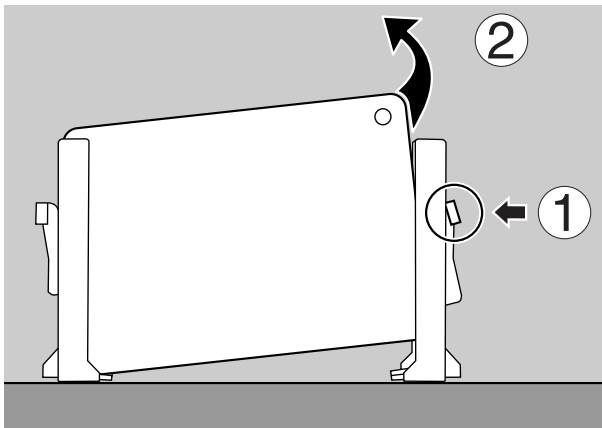2.   Slide the card between the guiderails until it clicks, and attach the connector to it.

KX-TA82491

Note

Use extra care to make sure you do not damage the part of the case marked with a circle.

3.   Close the covers and secure the screws. (→2.2.3 Opening/Closing Covers)

Note

To uninstall the card, follow the instructions illustrated below.

1.   Push the catch on the side of one guardrail in the direction of the arrow to release it.

2.   Lift the edge of the card while holding the catch open. (Do not touch the circuit board of the card during the operation.)

Programming Manual References

[599] Clear All OGMs of DISA

8.5 DISA OGM Clear

Feature Manual References
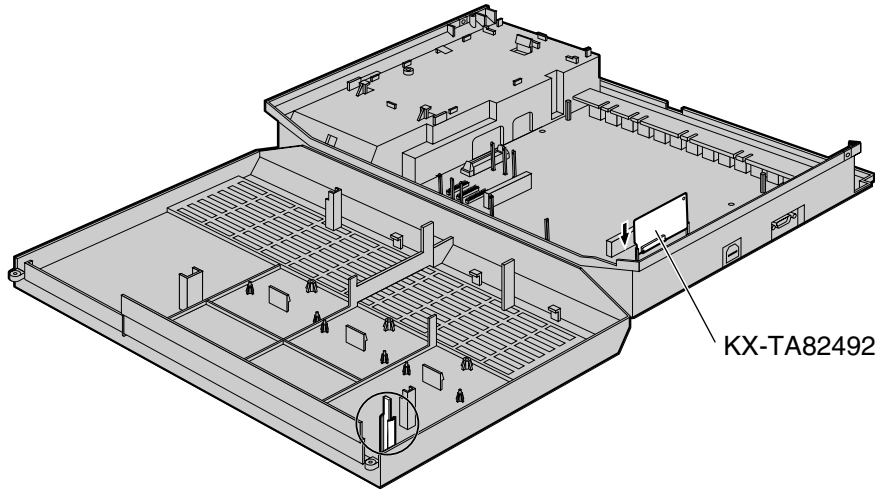
1.1.41 Direct Inward System Access (DISA)
1.1.88 Outgoing Message (OGM) for DISA

2.3.8   2-Channel Voice Message Card (KX-TA82492)

Function

Provides 60 minutes of recording time (2 channels) for messages using the Built-in Voice Message Feature.

1. Loosen the screws and open the top and bottom front covers. (→2.2.3 Opening/Closing Covers)
2. Slide the card between the guiderails until it clicks, and attach the connector to it.
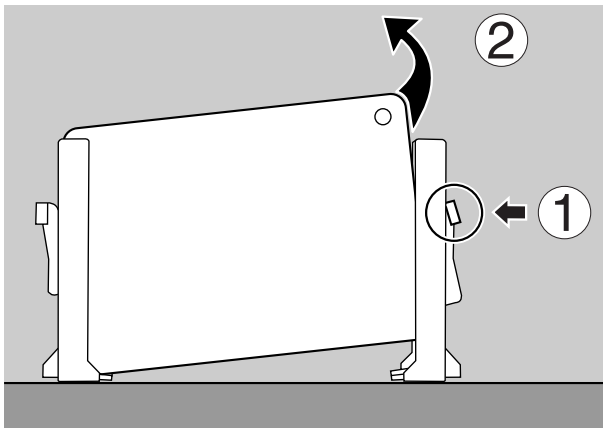

KX-TA82492

Note

Use extra care to make sure you do not damage the part of the case marked with a circle.

3. Close the covers and secure the screws. (→2.2.3 Opening/Closing Covers)

Note

To uninstall the card, follow the instructions illustrated below.

1. Push the catch on the side of one guardrail in the direction of the arrow to release it.
2. Lift the edge of the card while holding the catch open. (Do not touch the circuit board of the card during the operation.)

Programming Manual References

[808] BV Card Initialization

8.6 BV Card Initialization

Feature Manual References

1.1.8 Built-in Voice Message (BV)

2.4 Connecting Outside (CO) Lines

2.4.1 Connecting Outside (CO) Lines

Connection

1. Insert the modular plugs of the telephone line cords (2-conductor wiring) into the outside (CO) line jacks.
2. Connect the line cords to the terminal board or the modular jacks from the telephone company.
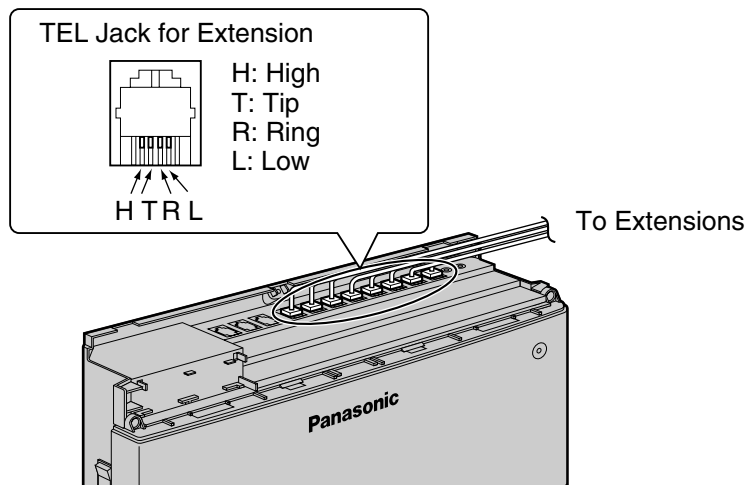
TEL Jack for Outside (CO) Line

T: Tip
R: Ring

T R

To Terminal Board or Modular Jacks
from the Telephone Company

Panasonic
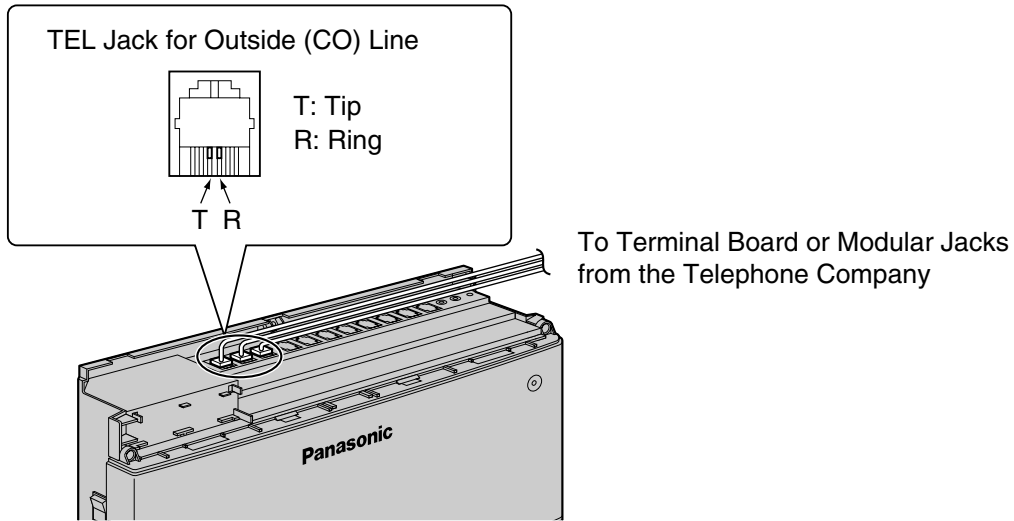
2.5 Connecting Extensions
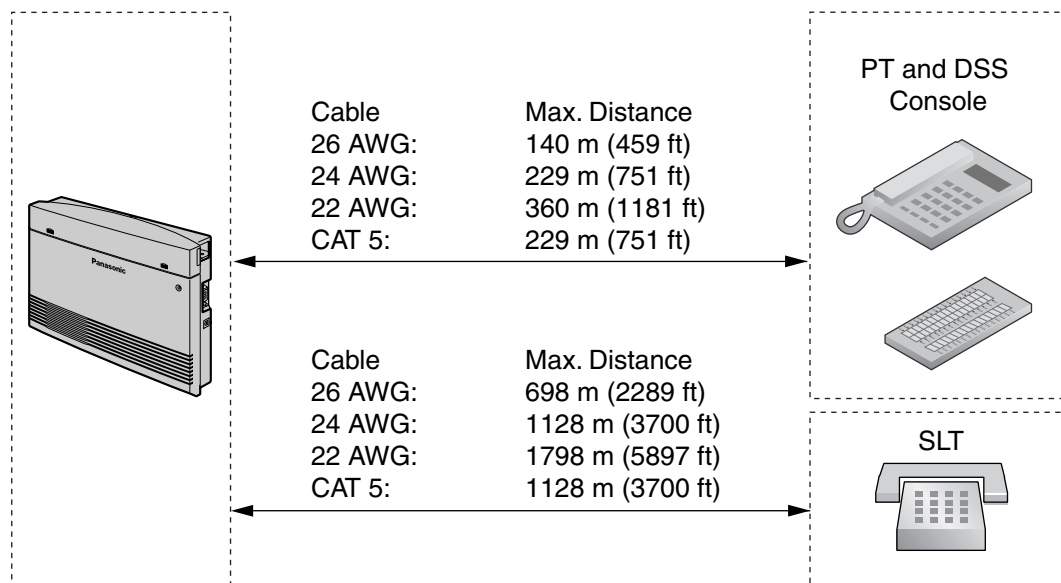
2.5.1 Connecting Extensions

Extension jacks can be used for proprietary telephones (PTs), Direct Station Selection (DSS) Consoles, single line telephones (SLTs), and Voice Processing Systems.

Connection

Insert the modular plugs of the telephone line cords (2- or 4-conductor wiring) into the modular jacks on the PBX.

Maximum Cabling Distance of Extension Wiring (Twisted Cable)

Cable	Max. Distance
26 AWG:	140 m (459 ft)
24 AWG:	229 m (751 ft)
22 AWG:	360 m (1181 ft)
CAT 5:	229 m (751 ft)

Cable	Max. Distance
26 AWG:	698 m (2289 ft)
24 AWG:	1128 m (3700 ft)
22 AWG:	1798 m (5897 ft)
CAT 5:	1128 m (3700 ft)

2- or 4-conductor wiring is required for each extension as listed below. There are 4 pins that can be used for connection: "T" (Tip), "R" (Ring), "H" (High) and "L" (Low).
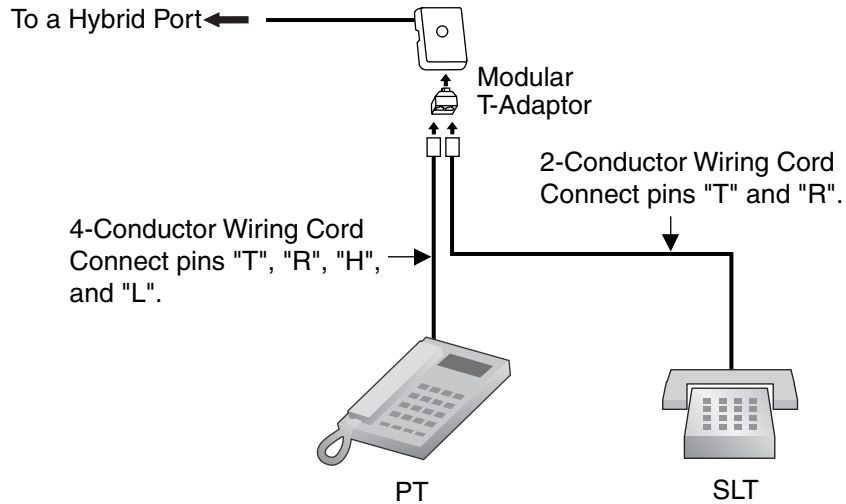
Telephone	Wiring
SLT	1-pair wire (T, R)
PT (such as KX-T7736)	2-pair wire (T, R, H, L)
DSS Console	1-pair wire (H, L)

Note

If a telephone or answering machine with an A-A1 relay is connected to the PBX, set the A-A1 relay switch on the telephone or answering machine to the "OFF" position.

2.5.2   Connecting Extensions in Parallel

Any single line telephone (SLT) can be connected in parallel with a proprietary telephone (PT) as follows:

To a Hybrid Port

Modular T-Adaptor

2-Conductor Wiring Cord Connect pins "T" and "R".

4-Conductor Wiring Cord Connect pins "T", "R", "H", and "L".

PT

SLT

Note

An answering machine, fax machine or modem can be connected in parallel with a PT in the same way as an SLT can.

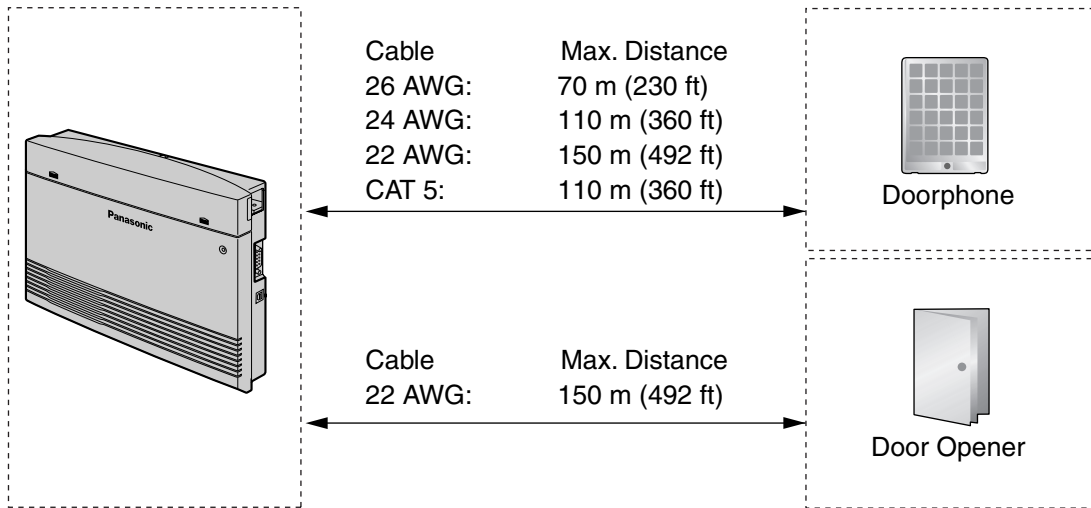### Feature Manual References

1.1.97 Paralleled Telephone

2.6 Connecting Doorphones and Door Openers

2.6.1 Connecting Doorphones and Door Openers

Up to 4 doorphones (KX-T30865) and 4 door openers (user-supplied) can be installed.

Maximum Cabling Distance

Cable	Max. Distance
26 AWG:	70 m (230 ft)
24 AWG:	110 m (360 ft)
22 AWG:	150 m (492 ft)
CAT 5:	110 m (360 ft)

Doorphone

Cable	Max. Distance
22 AWG:	150 m (492 ft)

Door Opener

Door opener current limit: 30 V DC/125 V AC, 3 A maximum

Installing the Doorphone (KX-T30865)

1. Loosen and remove the screw at the bottom of the case to separate the doorphone into 2 halves.
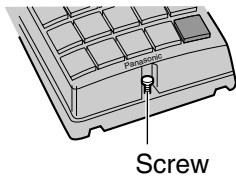
Screw

2. Pass the wires through the hole in the base cover, and attach the base cover to a wall using 2 screws.
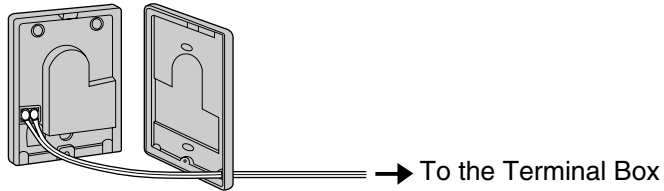

Screw

To the Terminal Box
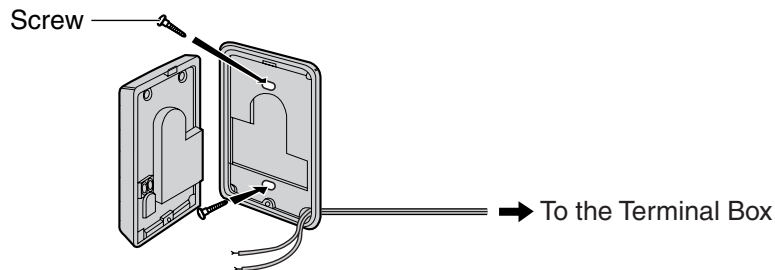
Note

Two kinds of screws are included with the KX-T30865. Please choose the appropriate screws for your wall type.

⬤▬▬▬ : when a doorphone plate has been fixed to the wall

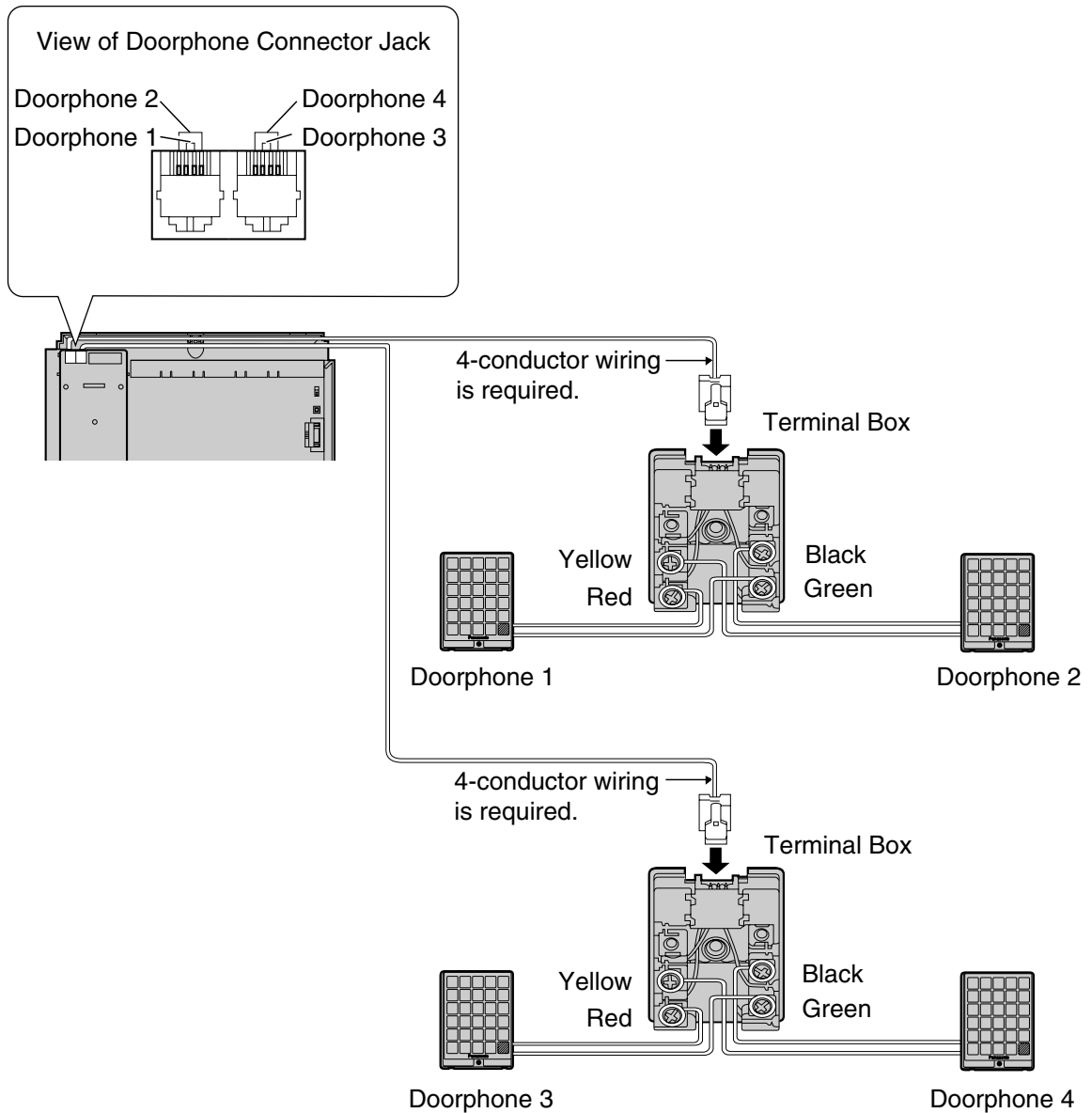⬤▭▭ : when you wish to install the doorphone directly to the wall

3. Connect the wires to the screws located in the front cover.

→ To the Terminal Box

**4.** Re-attach the 2 halves and re-insert and tighten the screw.

Connecting Doorphones (KX-T30865)

1. Connect the Doorphone Card to the terminal boxes using 4-conductor wiring and modular connectors.

2. Connect the wires of doorphones 1 and 3 to the red and green screws on the appropriate terminal box.

3. Connect the wires of doorphones 2 and 4 to the yellow and black screws on the appropriate terminal box.

View of Doorphone Connector Jack

Doorphone 2   Doorphone 4
Doorphone 1   Doorphone 3

4-conductor wiring is required.

Terminal Box

Yellow   Black
Red   Green

Doorphone 1   Doorphone 2

4-conductor wiring is required.

Terminal Box

Yellow   Black
Red   Green

Doorphone 3   Doorphone 4

Connecting Door Openers

1. Use a flathead screwdriver to press and hold open the button below the terminal, and insert the wire coming from the door opener into the terminal.

Door Opener 1

Door Opener 2

Door Opener 3

Door Opener 4

To the Door Openers
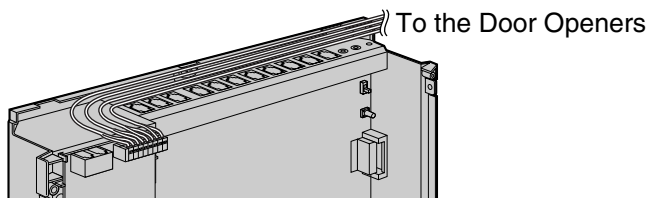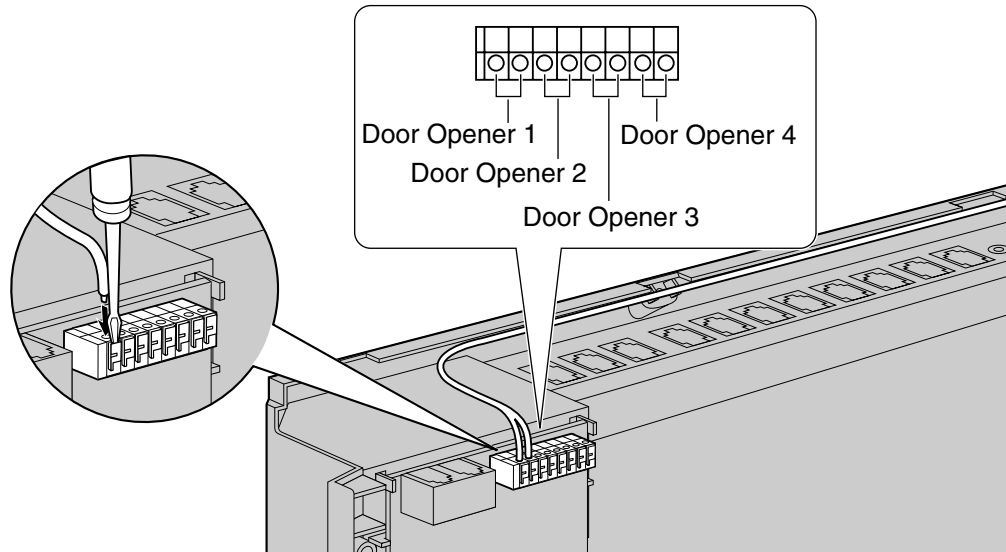
2. Wrap the strap around all of the cords. (→2.2.4 Securing Cords)

Note

- We recommend using a UL1015, 26 AWG to 22 AWG wire or an equivalent for wiring.
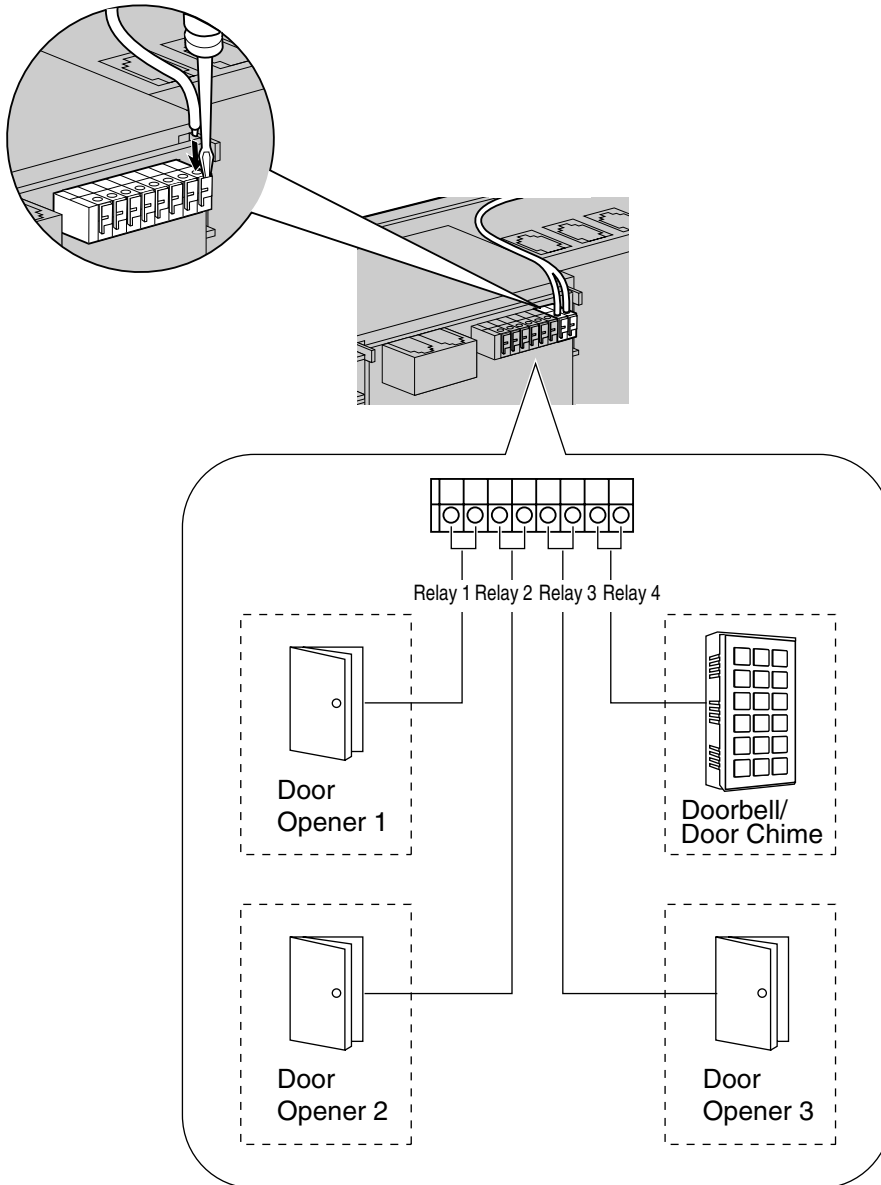
Feature Manual References

1.1.46 Door Open

1.1.48 Doorphone Call

2.7 Connecting Doorbell or Door Chime

2.7.1 Connecting Doorbell or Door Chime

Use a flathead screwdriver to press and hold open the button below the terminal, and insert the wire coming from the doorbell or door chime into the terminal. You can use a standard doorbell or door chime. For more details, please consult your dealer.
Refer to "2.6 Connecting Doorphones and Door Openers" for connecting doorphones (KX-T30865) and door openers.
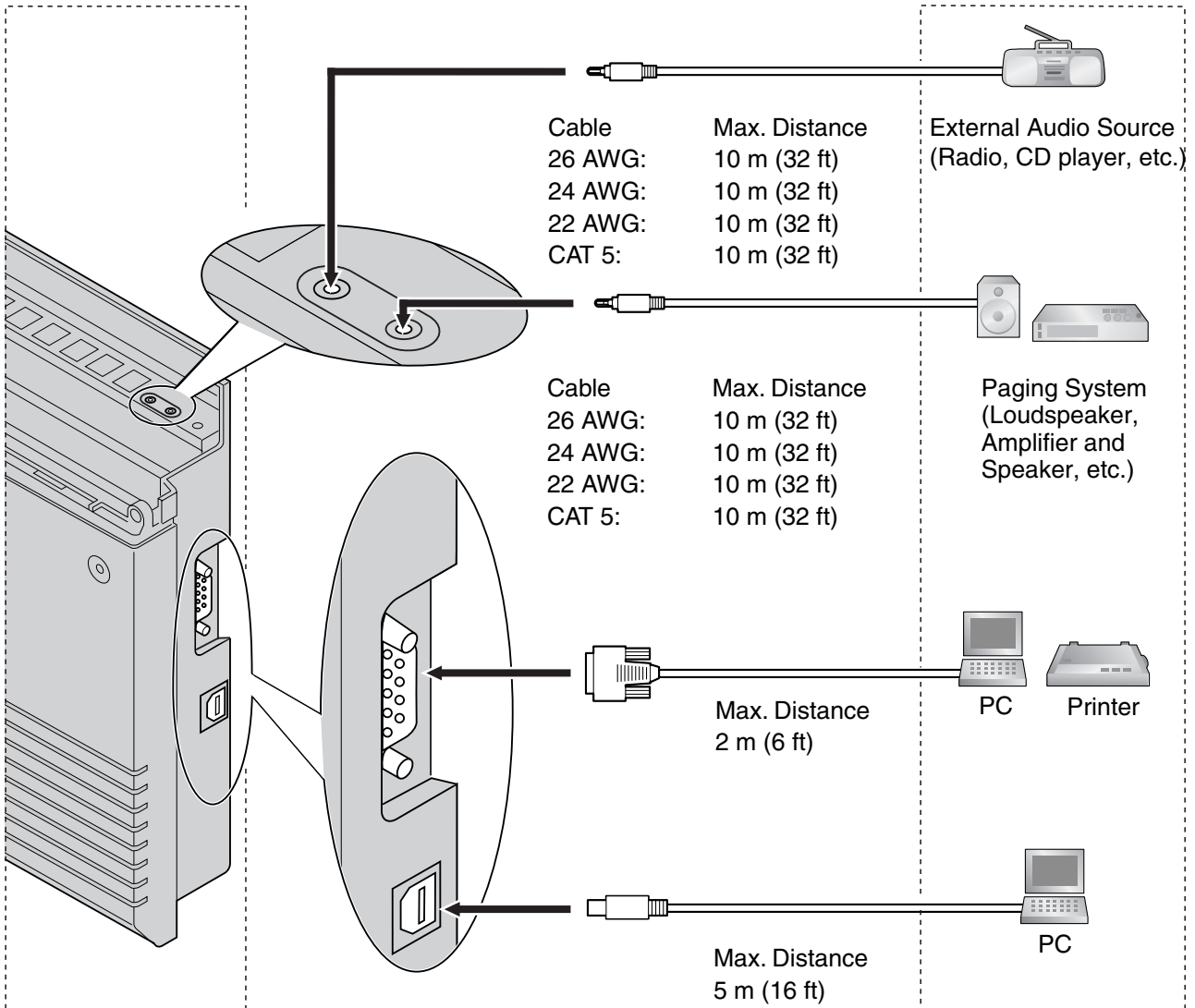

Feature Manual References

1.1.47 Doorbell/Door Chime
1.1.48 Doorphone Call

2.8 Connecting Peripherals

2.8.1 Connecting Peripherals

Cable	Max. Distance	External Audio Source
26 AWG:	10 m (32 ft)	(Radio, CD player, etc.)
24 AWG:	10 m (32 ft)	
22 AWG:	10 m (32 ft)	
CAT 5:	10 m (32 ft)	

Cable	Max. Distance	Paging System
26 AWG:	10 m (32 ft)	(Loudspeaker,
24 AWG:	10 m (32 ft)	Amplifier and
22 AWG:	10 m (32 ft)	Speaker, etc.)
CAT 5:	10 m (32 ft)	

Max. Distance 2 m (6 ft)   PC   Printer

Max. Distance 5 m (16 ft)   PC

Note

Be sure to comply with the above maximum distance between the PBX and each peripheral.

BGM/MOH

1 audio source (user-supplied), such as a radio or CD player, can be connected to the PBX and used as the source of Background Music (BGM) and Music on Hold (MOH).

Connect a cable from the audio output (earphone jack, headphone jack, etc.) of the audio source to

the MOH Jack of the PBX.
Use an EIAJ RC-6701 A plug (2-conductor, 3.5 mm [1/8 in] in diameter).

- Input impedance: 8 Ω

CAUTION

- Do not force audio cables into the jacks. Doing so may damage the connections and cause the audio to cut in and out.
- The MOH port is an SELV port and should only be connected to an approved SELV device.

Notes

- Use the supplied audio source connector in the event that the user-supplied audio cable connector is too long and does not fit when the top front cover of the PBX is closed. Remove the connector from the user-supplied audio cable, expose the bare cable, and attach the supplied audio source connector.
- When the PBX and external audio source are not connected to the same ground, a humming noise may be heard in the BGM and MOH.
- The audio source used for BGM and MOH is determined by system programming.
- To adjust the sound level of the MOH, use the volume control on the external audio source.

Feature Manual References

1.1.7 Background Music (BGM)

1.1.85 Music on Hold

Pager

Only 1 paging device (user-supplied) can be connected to the PBX.
Use an EIAJ RC-6701 A plug (2-conductor, 3.5 mm [1/8 in] in diameter).

- Output impedance: 600 Ω

CAUTION

The External Paging Jack is an SELV port and should only be connected to an approved SELV device.

Notes

- Use the supplied pager connector in the event that the user-supplied pager cable connector is too long and does not fit when the top front cover of the PBX is closed. Remove the connector from the user-supplied pager cable, expose the bare cable, and attach the supplied pager connector.
- To adjust the sound level of the pager, use the volume control on the loudspeaker or amplifier.

Feature Manual References

1.1.92 Paging—SUMMARY

PC/Printer (via RS-232C)

A PC can be connected via the RS-232C interface and used to log and display call records, and program the PBX. A printer can also be connected, to print call records.
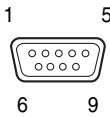Connect the PC or printer via an RS-232C cable (user-supplied).
When using special accessories such as cable, the user should use those specified in this installation manual to comply with the limits for a Class B digital device pursuant to the FCC Rules.
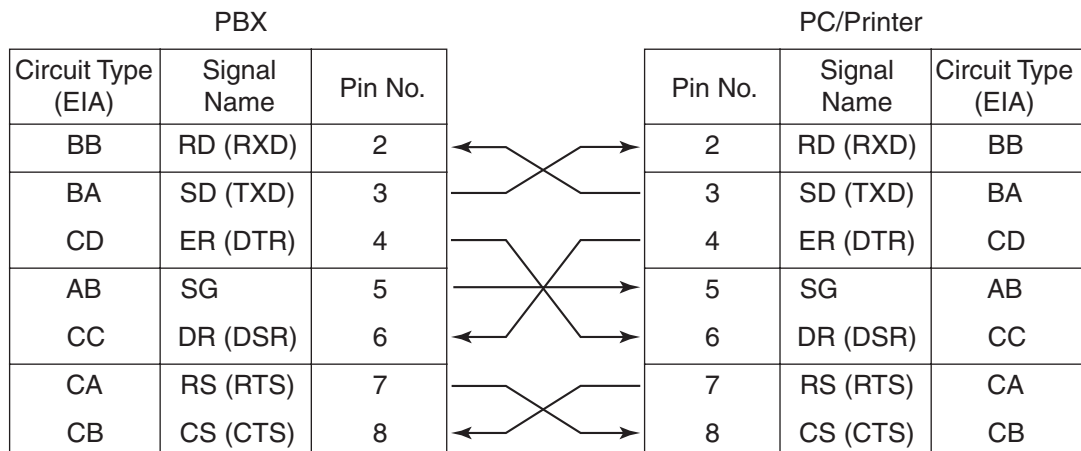
Note

Use an RS-232C cross cable when connecting the PBX with a PC.
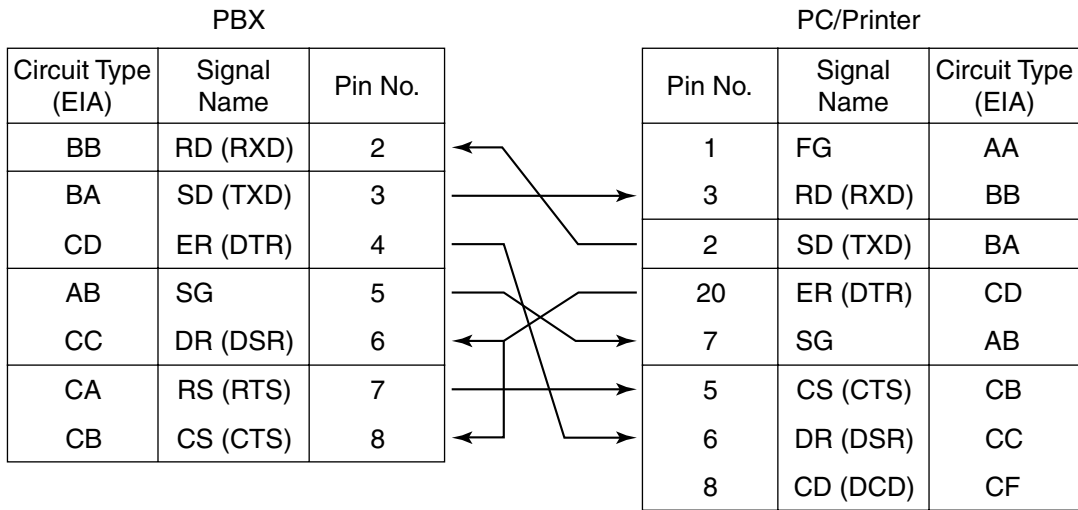
Pin Assignments

	No.	Signal Name	Function	Circuit Type	
				EIA	**CCITT**
	2	RD (RXD)	Receive Data	BB	104
1 5	3	SD (TXD)	Transmit Data	BA	103
(0 0 0 0 0)	4	ER (DTR)	Data Terminal Ready	CD	108.2
6 9	5	SG	Signal Ground	AB	102
	6	DR (DSR)	Data Set Ready	CC	107
	7	RS (RTS)	Request To Send	CA	105
	8	CS (CTS)	Clear To Send	CB	106

Connection Charts

For connecting a PC/printer with a 9-pin RS-232C connector

PBX   PC/Printer

Circuit Type (EIA)	Signal Name	Pin No.		Pin No.	Signal Name	Circuit Type (EIA)
BB	RD (RXD)	2		2	RD (RXD)	BB
BA	SD (TXD)	3		3	SD (TXD)	BA
CD	ER (DTR)	4		4	ER (DTR)	CD
AB	SG	5		5	SG	AB
CC	DR (DSR)	6		6	DR (DSR)	CC
CA	RS (RTS)	7		7	RS (RTS)	CA
CB	CS (CTS)	8		8	CS (CTS)	CB

For connecting a PC/printer with a 25-pin RS-232C connector

PBX

Circuit Type (EIA)	Signal Name	Pin No.
BB	RD (RXD)	2
BA	SD (TXD)	3
CD	ER (DTR)	4
AB	SG	5
CC	DR (DSR)	6
CA	RS (RTS)	7
CB	CS (CTS)	8

PC/Printer

Pin No.	Signal Name	Circuit Type (EIA)
1	FG	AA
3	RD (RXD)	BB
2	SD (TXD)	BA
20	ER (DTR)	CD
7	SG	AB
5	CS (CTS)	CB
6	DR (DSR)	CC
8	CD (DCD)	CF

RS-232C Signals

- **Receive Data (RXD):**…(input)
  Carries signals from the printer or the PC to the PBX.
- **Transmit Data (TXD):**…(output)
  Carries signals from the PBX to the printer or the PC. Stays in "Mark" status unless data or BREAK signals are being transmitted.
- **Data Terminal Ready (DTR):**…(output)
  This signal line is turned ON by the PBX to indicate that it is ON LINE. Circuit ER (DTR) ON does not indicate that communication has been established with the printer or the PC. It is switched OFF when the PBX is OFF LINE.
- **Signal Ground (SG)**
  Connects to the DC ground of the PBX for all interface signals.
- **Data Set Ready (DSR):**…(input)
  An ON condition of circuit DR (DSR) indicates that the printer or the PC is ready. Circuit DR (DSR) ON does not indicate that communication has been established with the printer or the PC.
- **Request To Send (RTS):**…(output)
  This is held ON whenever DR (DSR) is ON.
- **Clear To Send (CTS):**…(input)
  An ON condition of circuit CS (CTS) indicates that the printer or the PC is ready to receive data from the PBX. The PBX does not attempt to transfer data or receive data when circuit CS (CTS) is OFF.
- **Frame Ground (FG)**
  Connects to the unit frame and the ground conductor of the AC cord.
- **Data Carrier Detect (DCD):**…(input)
  An ON condition of circuit CD (DCD) indicates the data terminal (DTE) that the carrier signal is being received by.

Feature Manual References

PC (via USB 1.1 interface)

A PC running the KX-TA Maintenance Console software can be connected via the USB interface and used to program the system and upload/download data to the PBX.

Pin Assignments

No.	Signal Name
1	VBUS
2	USB D-
3	USB D+
4	GND

Programming Manual References

8.1 Firmware Upgrade

Feature Manual References

1.1.58 Firmware Upgrade

2.9 Power Failure Connections

2.9.1 Power Failure Connections

When the power supply to the PBX fails, power failure transfer will switch from the current connection to the Power Failure Connections.

Power Failure Connections connect a specific extension and an outside (CO) line in the event of power failure as follows:

Outside (CO) line 1—extension (T, R) jack 01

Outside (CO) line 4—extension (T, R) jack 09

Outside (CO) line 7—extension (T, R) jack 17

Notes

- In the event of a power failure, system memory is protected by a factory-provided lithium battery. No system data will be lost, except for the Camp-on, Saved Number Redial, Last Number Redial and Call Park data.
- The current connection automatically switches to the Power Failure Connection when the power supply stops.
- Proprietary telephones (PTs) cannot be used during a power failure. Therefore, we recommend connecting single line telephones (SLTs) in parallel with PTs to extension jacks 01, 09, and 17.

Feature Manual References

1.1.102 Power Failure Transfer

CAUTION

DANGER OF EXPLOSION EXISTS IF THE BATTERY IS INCORRECTLY REPLACED. REPLACE THE BATTERY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE BATTERY MANUFACTURER. DISPOSE OF USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.

2.10 Starting the Advanced Hybrid System

2.10.1 Starting the Advanced Hybrid System

This section explains the procedure for starting the PBX for the first time, with default values, or when you wish to re-initialize the PBX.

1. Make sure that all outside (CO) lines you use are connected to the PBX.

2. Set the Power Switch to the "OFF" position.

3. Connect the AC cord to the PBX, then plug the AC cord into an AC outlet.

4. Set the Power Switch to the "ON" position.

Note

For safety reasons, do not stretch, bend, or pinch the AC cord.
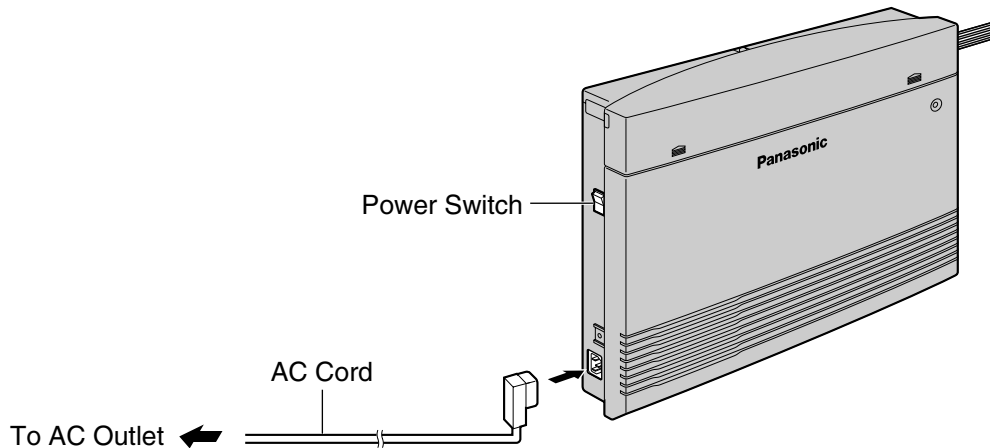
5. Perform the following operation with a proprietary telephone (PT) connected to JACK 01.

   a. Press the PROGRAM button.

   b. Press ✳ #.

   c. Enter 1234.

   d. Enter 999.

   e. Press the NEXT (SP-PHONE) button.

   f. Press the SELECT (AUTO ANS/MUTE) button until "All Para" is displayed.

   g. Press the STORE (AUTO DIAL/STORE) button.

   h. Press the END (HOLD) button.

   i. Press the PROGRAM button.

   • The PBX will be initialized with the default values. The type of outside (CO) lines is automatically detected.

   • If the PBX does not function properly, refer to "4.1.5 System Reset with System Data Clear".

6. Program the PBX using either one of the following methods:

   a. PC programming. Refer to "Section 3, Guide for KX-TA Maintenance Console".

   b. PT programming. Refer to "2 PT Programming" of the Programming Manual.

CAUTION

- The PBX is powered as long as the AC cord is plugged into an AC outlet, even if the Power Switch is set to the "OFF" position.
- The power supply cord is used as the main disconnect device. Ensure that the AC outlet is located/installed near the equipment and is easily accessible.

Notes

- If the outside (CO) lines you use are not connected to the PBX, outside (CO) line type can not be automatically detected.
- Use only the AC cord included with the PBX.
- If the PBX will not be used for an extended period of time, set the Power Switch to the "OFF" position and disconnect the AC cord from the AC outlet to conserve power.

Programming Manual References

[999] System Data Clear

8.4 System Data Clear

Feature Manual References

1.1.103 PT Programming

Section 3

Guide for KX-TA Maintenance Console

This section explains how to connect a PC to the PBX and get started using KX-TA Maintenance Console.

3.1 Installing KX-TA Maintenance Console

3.1.1 Installing KX-TA Maintenance Console on a PC

System Requirements

Operating System

- Microsoft® Windows® 98 SE, Windows Me, Windows 2000, or Windows XP

Hardware

- CPU: 300 MHz Intel® Celeron® or faster
- RAM: At least 128 megabytes (MB) of available RAM
- Hard disk space: At least 100 MB of space for the installation, and approximately 2 MB of additional space for user files.

Setting the Password and Password Security

To maintain system security, a password is required to perform system programming. When KX-TA Maintenance Console is started for the first time, the Quick Setup utility will ask you to set the system password. To avoid unauthorized access and possible fraudulent dialing, do not disclose the password.

Warning to the Installer regarding the system password

1. Please inform the customer of the importance of the password and the possible dangers if it becomes known to others.

2. To avoid unauthorized access and possible fraudulent dialing, maintain the secrecy of the password.

3. We strongly recommend that you change the default password value to something else for reasons of system security. It is best to use a password of 7 digits.

4. Please change the password periodically.

5. If a system password is forgotten, it can be found by loading a backup of the system data into a PC, and checking the password using the KX-TA Maintenance Console software. If you do not have a backup of the system data, you must reset the PBX to its factory defaults and reprogram it. Therefore, we strongly recommend maintaining a backup of the system data.

   For more information on how to back up the system data, refer to the on-line help that appears by selecting the Help menu during PC programming. However, as system passwords can be extracted from backup copies of the system data file, do not allow unauthorized access to these files.

<u>Note</u>

This PBX has only one system password. It can be changed by either PT programming or PC programming. For this reason, the password can consist of numerals only.

Installing KX-TA Maintenance Console

<u>**Notes**</u>

- Before installing or uninstalling the software, be sure to close any open applications.
- To install or uninstall the software on a PC running Windows 2000 Professional or Windows XP Professional, you must be logged in as a user in the "Administrators" group.

1. Insert the included CD-ROM into the CD-ROM drive of your PC.
   The main screen will appear automatically.

2. Click **Maintenance Console**.

3. Double-click the setup file to run the installer. (Its icon is shown here, on the left.)

4. Follow the on-screen instructions provided by the installation wizard.

Programming Manual References

3.2 PC Programming

Feature Manual References

1.1.99 PC Programming

3.2 Connection

3.2.1 Connection

PBX features and settings can be customized using a PC and the KX-TA Maintenance Console software.
Programming can be performed both on-site, using a PC connected directly to the PBX, and off-site, by accessing the PBX via modem.

Serial Interface Connection

A PC can be connected to the RS-232C port of the PBX, or to the USB port for faster access.
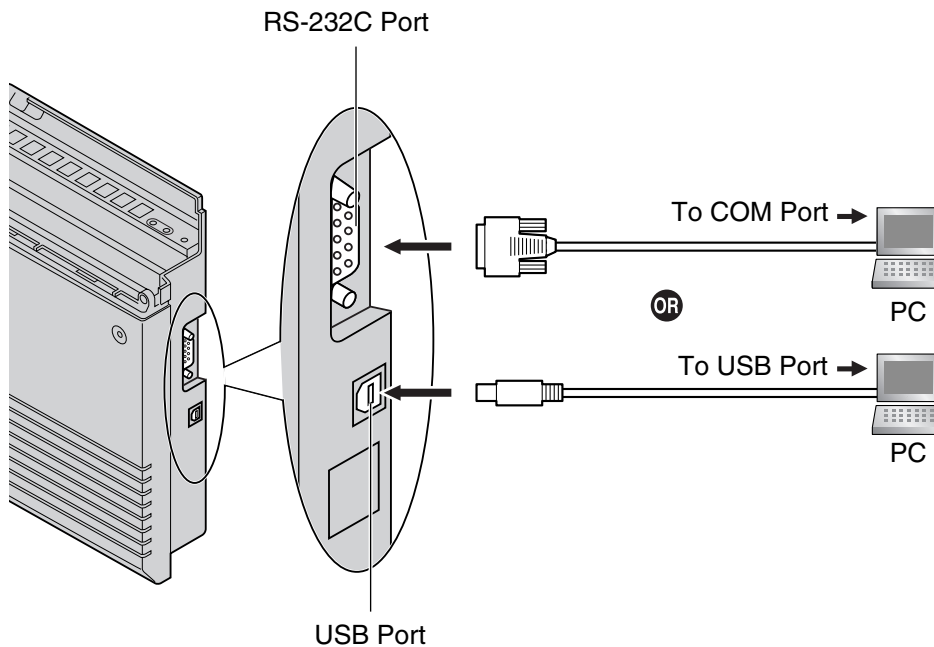
Notes

- For pin assignments and maximum cabling distance, refer to "2.8 Connecting Peripherals".

- When connecting the KX-TA Maintenance Console to the PBX using an RS-232C cable, assign the following values to the Serial Interface (RS-232C) port of the PBX through system programming, "[800] SMDR RS-232C Parameter":

  - Baud Rate: 9600 bps
  - Word Length: 8 bits
  - Parity Bit: None
  - Stop Bit: 1 bit

Installing the USB Driver

CAUTION

Installing the USB driver may prevent the USB driver for KX-TDA series or PC Console/Phone Software from functioning correctly. In this case, update the USB drivers as necessary from the following folders on the included CD-ROM:

KX-TDA Series: CD-ROM Drive:\TDA_USB Driver\TDA_USB Driver
PC Console/Phone Software: CD-ROM Drive:\TDA_USB Driver\T7601_USB Driver

Note

Before installing or uninstalling the driver, be sure to close any open applications.

Windows 98SE

1. Connect the PC to the PBX with a USB cable.
   The **Add New Hardware Wizard** will appear.
2. Click **Next**.
3. Select **Search for the best driver for your device. [Recommended]**, then click **Next**.
4. Select **Specify a location**, then click **Browse**.
5. Specify the folder containing the USB driver, **CD-ROM Drive:\USB driver\Win98**, then click **OK**.
6. Click **Next**.
7. Click **Next**.
8. Click **Finish**.

Note

If a dialog box appears asking you to restart your PC, restart the PC.

Windows Me

1. Connect the PC to the PBX with a USB cable.
   The **Add New Hardware Wizard** will appear.
2. Select **Specify the location of the driver [Advanced]**, then click **Next**.
3. Select **Search for the best driver for your device. [Recommended]**.
4. Select **Specify a location**, then click **Browse**.
5. Specify the folder containing the USB driver, **CD-ROM Drive:\USB driver\WinMe**, then click **OK**.
6. Click **Next**.
7. Click **Next**.
8. Click **Finish**.

Note

If a dialog box appears asking you to restart your PC, restart the PC.

Windows 2000

1. Connect the PC to the PBX with a USB cable.
   The **Found New Hardware Wizard** will appear.
2. Click **Next**.
3. Select **Search for a suitable driver for my device. [Recommended]**, then click **Next**.
4. Select **Specify a location**, then click **Next**.
5. Click **Browse**, and specify the folder containing the USB driver, **CD-ROM Drive:\USB driver\Win2000**, then click **Open**.
6. Click **OK**.
7. Click **Next**.
8. Click **Finish**.

Windows XP

1. Connect the PC to the PBX with a USB cable.
   The **Found New Hardware Wizard** will appear.

2. Select **Install from a list or specific location [Advanced]**, then click **Next**.

3. Select **Search for the best driver in these locations**.

4. Select **Include this location in the search:**, then click **Browse**.

5. Specify the folder containing the USB driver, **CD-ROM Drive:\USB driver\WinXP**, then click **OK**.

6. Click **Next**.

7. Click **Continue Anyway**.

8. Click **Finish**.

Programming Manual References

4.1 Software Modes

6.1 Connect

Feature Manual References

1.1.99 PC Programming

3.2.2 Starting KX-TA Maintenance Console for the first time

When you start the KX-TA Maintenance Console with the Installer Level Programmer Code and connect to the PBX for the first time after initialization (with factory default setting), Quick Setup will launch automatically. During Quick Setup, you will setup:

- The date and time. The PBX uses the date and time set to the PC.
- The System Password.
- The operator extension number.
- Automatic Configuration for CO Line Type (DTMF/Pulse).
- The feature numbers for Operator Call and Automatic Line Access.
- Extension numbers and names.
- The Numbering Plan type.
- Ringing assignment for each outside (CO) line (either all extensions, or a specific extension).

Note

The screenshots shown here are for reference only, and may differ from the screens displayed on your PC.
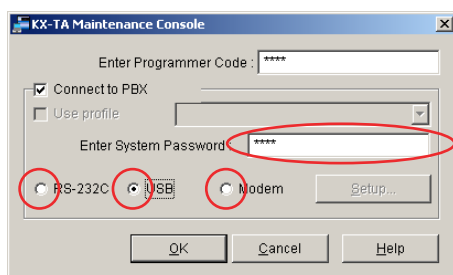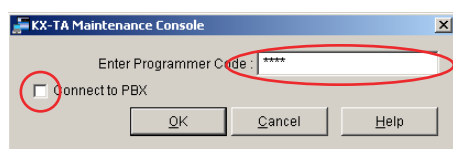
1. Start the KX-TA Maintenance Console software from the start menu. (**Start** →**Programs** →**KX-TA Maintenance Console**)

2. Type the Installer Level Programmer Code that was set during the KX-TA Maintenance Console installation.

3. **a.** Click the check box to connect to the PBX. Options will appear as shown here, on the left.

   b. Type the System Password. (default: **1234**)

   c. Select the method of connection.

   d. Click **OK** to log in.

4. Quick Setup starts. Follow the on-screen instructions and assign the items as prompted.

Note

Software features, design, and system requirements are subject to change.

Programming Manual References

4.1 Software Modes
6.1 Connect
8.2 Quick Setup

3.2.3   Accessing PBX via Internal Modem

1. Start the KX-TA Maintenance Console software from the start menu on your PC. (**Start** →**Programs** →**KX-TA Maintenance Console**)

2. Type the Installer Level Programmer Code that was set during the KX-TA Maintenance Console installation.

3. Click the check box to connect to the PBX. Options will appear as shown here, on the left.

4. Type the System Password. (default: 1234)

5. Select **Modem**, and click **Setup**.
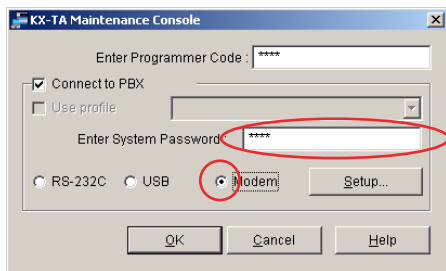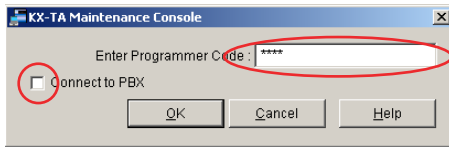
When the mode of the PBX outside (CO) line that will be accessed is 'MODEM':

1. For Dial Number, enter the telephone number assigned to the internal modem of the PBX.

2. Select **Auto (Tone)** or **Auto (Pulse)** for Dial Type.

3. Click **OK**.

4. Click **OK**. The PC will connect to the PBX.

When the mode of the PBX outside (CO) line that will be accessed is 'DISA':

1. For Dial Number, enter the telephone number assigned to the internal modem of the PBX, several pause symbols (',') and the Remote Maintenance feature number (for example: 01234567,,,,,729).

2. Select **Auto (Tone)** for Dial Type.

3. Click **OK**.

4. Click **OK**. The PC will connect to the PBX.

   Notes

   - The number of pause symbols to be inserted differs depending on the PC modem used.
   - Auto (Pulse) Dial Type cannot be used.

When the mode of the PBX outside (CO) line that will be accessed is 'Normal':

1. For Dial Number, enter the pause symbol (',').

2. Select **Manual** for Dial Type.

3. Click **Initialize**.

4. Click **OK**.

5. Click **OK**.

6. Dial the telephone number assigned to the outside (CO) line from a telephone connected in parallel with the PC.

7. Ask the respondent to transfer the call to the internal modem of the PBX. ('Transfer' + '729 [Remote Maintenance feature number]')

8. Click **OK** and wait for 2 or 3 seconds, and then go on-hook before you hear a tone from the modem. The PC will connect to the PBX.

Notes

• The AT command 'Use V.22bis' may be required to configure the modem to communicate with the PBX, depending on the modem (for example: "AT + MS = V22B").

• The AT commands 'Use V.42' and 'Use V.42bis' may be required to configure the modem to communicate with the PBX, depending on the modem.

• The AT command to dial without waiting for a dial tone may be required to configure the modem to communicate with the PBX, depending on the modem.

• The AT command to set the Result Code format to text beginning with 'CONNECT' when a connection is established may be required to configure the modem to communicate with the PBX, depending on the modem.

• If the Baud Rate (bps) is set too high or too low the modem may not be able to communicate with the PBX, depending on the modem or PC. In this case, adjust the Baud Rate (bps) and reconnect to the PBX.

Programming Manual References

4.1 Software Modes

6.1 Connect

Section 4

Troubleshooting

This section provides information on troubleshooting and resetting the PBX.
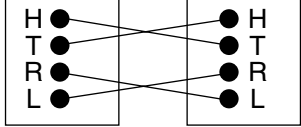
4.1 Troubleshooting

4.1.1 Installation
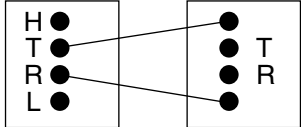
PROBLEM	PROBABLE CAUSE	SOLUTION
• Extension telephone does not function.	• Faulty connection between the PBX and telephone.	• Plug the telephone into the same extension port using a short telephone cord. If the telephone functions, then the connection between the PBX and the telephone must be repaired.
	• Faulty telephone.	• Plug the telephone into a known functioning extension port. If the telephone does not function, replace the telephone.
	• A telephone with an A-A1 relay is connected.	• Use a 2-wire cord. Set the A-A1 relay switch of the telephone to the "OUT" or "OFF" position.
	• Faulty extension card.	• Exchange the card for a known functioning one.
• Proprietary telephones (PTs) connected to extension jacks do not operate, but single line telephones (SLTs) do.	• The H and L pins of extension jacks may have shorted.	• Turn the Power Switch to the "OFF" position. Fix the shorted part, then turn the Power Switch to the "ON" position.
• Noise heard through external pager (loudspeaker).	• If using an amplifier, noise may be being introduced through the cable connecting the PBX and the amplifier or loudspeaker.	• Use a shielded cable to connect the PBX and the amplifier or loudspeaker. A shorter cable will introduce less noise.
• Audio (Music on Hold, Background Music) is distorted.	• Audio level from the output of the audio source is too high.	• Decrease the output level of the external audio source by using the volume control on the audio source.
• Speed Dialing or One-touch Dialing does not function.	• Incorrect programming.	• Store the outside (CO) line access number (for example, 9, 81 through 88) at the beginning of the telephone number.
• Improper operation other than the above.		• Turn the Power Switch to the "OFF" position, and then back to the "ON" position.

4.1.2   Connection
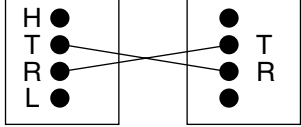
Telephone cord connecting the PBX and a proprietary telephone (PT):

CAUSE	SOLUTION
The T/R pins are connected to the H/L pins. H ● ● H T ● ● T R ● ● R L ● ● L PBX Extension	Use the correct cord (the inner 2 wires are for T/R and the outer 2 wires are for H/L).
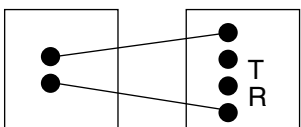
Telephone cord connecting the PBX and a single line telephone (SLT):

CAUSE	SOLUTION
The T/R pins are connected to the H/L pins. H ● T ● ● T R ● ● R L ● PBX Extension	Use the correct cord (the inner 2 wires are for T/R).

Telephone cord connecting the PBX and an SLT that is polarity-sensitive:

CAUSE	SOLUTION
The T and R pins are crossed over. H ● T ● ● T R ● ● R L ● PBX Extension	Reverse the connections of the T/R pins.

Telephone cord connecting an outside (CO) line and the PBX:

CAUSE	SOLUTION
The outside (CO) line(s) is connected to the H/L pins. ● ● T ● ● R Outside (CO) Line PBX	Reconnect the outside (CO) line(s) to the T/R pins of the telephone jack using 2-conductor wiring.

Can you dial an extension? — No → (PT/SLT causes)

Yes ↓

Can you dial out using an outside (CO) line? — No → (CO line cause)

4.1.3 Operation

PROBLEM	PROBABLE CAUSE	SOLUTION
• When using the speakerphone on an analog proprietary telephone, no sound is heard.	• The HANDSET/ HEADSET selector is set to the "HEADSET" position.	• When the headset is not used, set the HANDSET/HEADSET selector to the "HANDSET" position.
• The proprietary telephone (PT) does not ring.	• The ringer volume is set to off.	• Set to "HIGH" or "LOW".
• During a power failure, PTs connected to jack numbers 01, 09, or 17 do not operate.		• Only single line telephones (SLTs) can be used during a power failure. Disconnect the PT and connect an SLT.
• Outside (CO) line calls cannot be made with a PT.	• A flexible button on the PT has not been programmed to select an outside (CO) line.	• Program the CO buttons. Refer to "1.1.61 Flexible Buttons" in the Feature Manual.
• An SLT set to "tone" dialing mode cannot make calls.	• There may be something wrong with the DTMF receiver.	1. Select "Enable" for DTMF receiver 1 and "Disable" for DTMF receiver 2 through system programming, "[107] DTMF Receiver Check". 2. Try to make a call using a tone-type SLT connected to one of extension jacks 01–08. 3. If you cannot make the call, the problem may have been caused by DTMF receiver 1. If the call can be made, go to step 4. 4. Try DTMF receiver 2. Select "Disable" for DTMF receiver 1 and "Enable" for DTMF receiver 2 through system programming, "[107] DTMF Receiver Check", and make another call. If you cannot make the call, the problem may have been caused by DTMF receiver 2. If the call can be made, go to step 5. 5. Check the other 4 DTMF receivers the same way through "[107] DTMF Receiver Check" in system programming.

4.1.4   System Restart

If the PBX does not operate correctly, confirm that the operation/feature is being used correctly and refer to the Troubleshooting section if necessary. If the PBX still does not operate correctly, restart the PBX.

When the PBX is restarted:
- Calls on Hold are terminated.
- Calls on Exclusive Hold are terminated.
- Calls in progress are terminated.
- Automatic Callback Busy (Camp-on) is cleared.
- Call Park is cleared.
- Last Number Redial is cleared.
- Saved Number Redial is cleared.

No other data is cleared by System Restart.

1. To restart the PBX, turn the Power Switch to the "OFF" position, then turn the Power Switch back to the "ON" position.

Note

If the PBX still does not operate correctly, please see "4.1.5 System Reset with System Data Clear".

4.1.5   System Reset with System Data Clear

When the PBX does not operate correctly after restarting, you can clear the programming data stored in the PBX. The PBX will restart with the default settings.

1. Make sure that all outside (CO) lines you use are connected to the PBX.

2. Slide the System Clear Switch to the "CLR" position.

3. Press the Reset Button, and then return the System Clear Switch to the "NOR" position before the power indicator stops flashing. (The power indicator will flash for about 5 seconds.)

CAUTION

Before touching the System Clear Switch and Reset Button, put on a grounding strap.

Notes

- After pressing the Reset Button, make sure to return the System Clear Switch to the "NOR" position before the power indicator stops flashing, otherwise the system data will not be cleared.

- The recorded OGMs for DISA and Built-in Voice Message are not cleared by the System Data Clear.

System Clear Switch

Reset Button
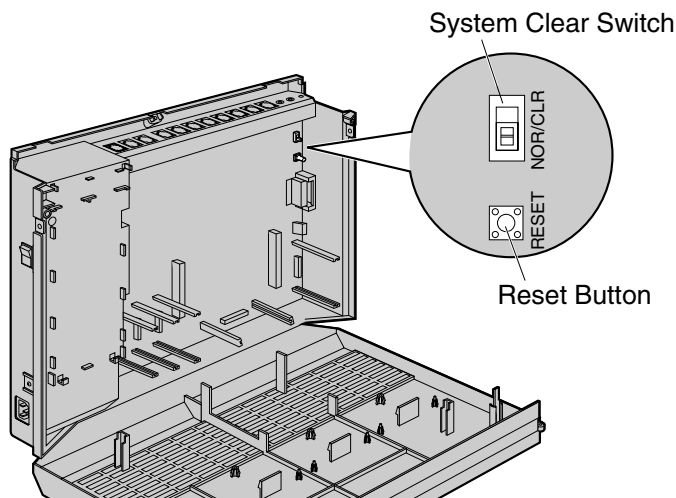
Programming Manual References

[999] System Data Clear

8.3 System Reset

8.4 System Data Clear

Index

Numerics

A

B

C

E

G

I

L

M

N

O

P

S

T

U

W

169 mm (6-5/8 in)

236 mm (9-5/16 in)

Install a screw here.

118 mm (4-5/8 in)

TEMPLATE FOR WALL MOUNTING

1. Copy or print this template and place it on the wall.

2. Install the screws as marked.
   If you mount the main unit on a concrete or mortar wall, fit anchor plugs
   (not included) into the wall beforehand.

3. Hook the unit onto the screw heads.

Note

Make sure to set the print size to correspond with the size of this page.
If the dimensions of the paper output still deviate slightly from the measurements
indicated here, use the measurements indicated here.

Install a screw here.

Install a screw here.

185 mm (7-5/16 in)

92.5 mm (3-5/8 in)

PSQX3400ZA KK0405PY0